

AR18



Innovation and productivity:
keys to market success.

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Version française

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Cover

A representation of the many elements of corporate activity that are involved in the company's annual productivity improvement. They include: new plants and equipment; new manufacturing processes; new products; re-designed products; new business systems; new management techniques; procurement programs; cost reduction programs for all activities, all products and all levels of management; special seminars and employee/management training techniques.

Northern Telecom Limited

Northern Telecom Limited is the principal supplier of telecommunications equipment in Canada and the second largest in North America. It operates 26 manufacturing plants in Canada, 14 in the United States and one each in Eire, Turkey, Brazil and Malaysia. A subsidiary, Nedco Ltd., is the largest Canadian distributor of electrical and telecommunications products; another subsidiary, Bell-Northern Research Ltd., with five laboratories in Canada and one in Palo Alto, Cal. is the largest industrial research organization in Canada.

Form 10K

The Form 10K annual report for 1977 as filed by the company with the Securities and Exchange Commission in Washington, D.C., is available to shareholders without charge upon request to Roy T. Cottier, vice-president, corporate relations.

Annual Meeting

The annual meeting of shareholders will take place at 2 p.m., Thursday, April 20, 1978 in the Hyatt Regency Hotel, Montreal, Quebec.

Listing of Stock

Montreal Stock Exchange
New York Stock Exchange
The Toronto Stock Exchange
Vancouver Stock Exchange
Stock Symbols:
NT on NYSE
NTL on Montreal, Toronto
and Vancouver exchanges

Transfer Offices

Company offices:
1050 Beaver Hall Hill,
Montreal
395 University Avenue,
Toronto

Montreal Trust Company
Halifax, Winnipeg, Regina,
Calgary, Vancouver

Manufacturers Hanover
Trust Company
New York, N.Y.

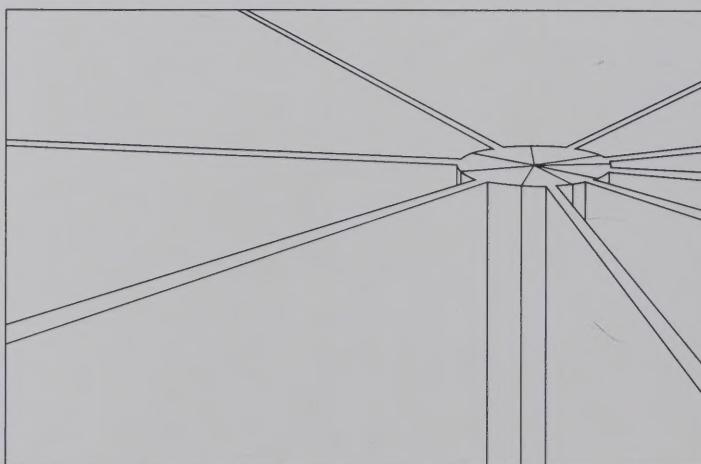
Continental Illinois
National Bank and Trust
Company of Chicago
Chicago, Ill.

Registrars

Montreal Trust Company
Halifax, Montreal, Toronto,
Winnipeg, Regina, Calgary,
Vancouver

Manufacturers Hanover
Trust Company
New York, N.Y.

Continental Illinois
National Bank and Trust
Company of Chicago
Chicago, Ill.



Report to shareholders

Consolidated sales for the second quarter of 1977 were \$342.4 million, up 12.2 percent from the \$305.1 million recorded for the same period of 1976. Consolidated net earnings rose 7.7 percent for the second quarter of 1977 to \$24.8 million, or \$0.93 per share, compared with \$23.0 million, or \$0.87 per share in the second quarter last year.

For the first half of the year, consolidated sales rose 11.7 percent to \$649.9 million, compared with consolidated sales of \$581.7 million in the first six months of 1976. Net earnings for the first half of 1977 were \$45.1 million, or \$1.70 per share, compared with \$42.8 million, or \$1.62 per share earned in the same period of 1976, a 5.2 percent increase.

These results include extraordinary gains of \$0.02 per share for the second quarters of 1977 and 1976 and \$0.04 per share for the first half of each year, principally from the use of a subsidiary's prior years' tax losses.

The results for the quarter and six months periods reflect the consolidation in 1977 of Cook Electric Company, acquired in December 1976, and Bell-Northern Research Ltd. (BNR), which became a subsidiary in August 1976. Consolidated sales for these companies amounted to \$17.8 million for the quarter and \$33.7 million for the first six months of 1977.

The earnings for the six months in 1977 provide pro-rata for the favorable effects of the three percent inventory tax credit contained in the Canadian federal budget introduced on March 31. The research and development tax credit also introduced in that budget is included pro-rata for the second quarter. The credits before the extraordinary item contributed to reducing our effective income tax rate to 40.6 percent for the period in 1977 from 42.8 percent for the first half of 1976.

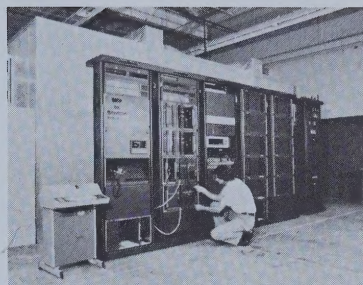
The improvement in sales and earnings for the second quarter, traditionally our best quarter, and first half of this year to record levels reflects the fine performance of our U.S. and Canadian operating companies. In particular, our U.S. operations recorded significantly higher sales and earnings compared with the first half of the past year.

Research and development expenses in the first six months were 23 percent higher compared with the 1976 amount for the period. This increase was mainly attributable to our intensive program to develop our new family of digital switching and transmission products. We do not expect our R&D expenditures will increase at as high a rate in the second half of the year.

Northern Telecom has entered a period of transition with the development and introduction of our new digital products. Market reception to the digital products, the most important measure of success, has been very encouraging.

More than 235 of our SL*-1 digital business communications system have been sold or ordered since it was introduced in December 1975. In addition to our North American sales of SL-1, we have licensed manufacturers in France, the U.K., and Sweden to produce and market the system for their markets with their first sales expected in 1978. Other SL-1s are operating in Saudi Arabia, Iraq, Singapore, Ireland, Taiwan, Denmark and Malaysia.

Orders have also been very strong for our DMS*-1, the digital subscriber carrier system or remote switch with a capacity of up to 256 lines, and for our DMS-10 local switch which can grow to a size of up to 6,000 lines. Sales of



First DMS-10 to be shipped gets a final check at the Creedmoor, N.C. electronic switching plant.

DMS-1 for delivery in 1977 have exceeded our forecast by about 20 percent. Several have been in service for a few months now and the response from our customers has been excellent.

Our first DMS-10 switch was shipped on schedule on July 18 from the Creedmoor, North Carolina, switching plant. It has been processing calls since July 25 and will be put into service in Fort White, Florida for North Florida Telephone Company, a subsidiary of Mid-Continent Telephone Corporation. Our large digital local and toll switches are now undergoing trials in Ottawa. A number of DMS-100s, a local switch which can grow to 100,000 lines, have been ordered with deliveries beginning late next year.

We have also signed our first orders for the DMS-200 digital toll switch with independent telephone companies in the U.S. for delivery beginning in late 1978. Teleglobe Canada has signed an \$11 million contract with Northern Telecom Canada Limited providing for the design, manufacture and installation of a DMS-300 digital gateway switch. This DMS-300, which will handle switching of international calls, will be put into service in 1980.

Northern Telecom has now received orders or firm commitments from Canadian and U.S. companies for 140 DMS systems. Represented in these orders are more than half of the 15 largest independent telephone companies in the U.S.

We continue to be cautiously optimistic about our prospects for the balance of 1977 and for 1978. The lackluster performance of the Canadian economy could adversely affect our results should it cause the Canadian telephone companies to further reduce their capital spending plans for this year and next and if it results in a continuance of the poor outlook for the construction industry customers of Nedco, our distribution company.

The anticipated sales of our digital products makes the future beyond 1978 look very bright to us indeed.

Northern Telecom, Inc. has purchased about 20 percent of the outstanding voting stock, assuming full conversion of all outstanding convertible preferred shares, of a large independent semiconductor manufacturer, Intersil, Inc., based in Cupertino, California. A merger of the companies is not contemplated at this time.

A quarterly dividend of 16 cents per share was declared by the board of directors on May 26, payable June 30 to shareholders of record at the close of business on June 6.

Robert C. Scrivener
Chairman of the Board

Walter F. Light
President

Interim condensed consolidated statement of earnings

	(thousands of dollars)	
	Three months ended June 30	
	1977	1976
Sales	\$342,416	\$305,050
Cost of sales & operating expenses	301,347	265,867
Earnings from operations	41,069	39,183
Income from investments less interest charges	765	562
Earnings before underlisted items	41,834	39,745
Provision for income taxes	16,772	16,688
	25,062	23,057
Minority interest in net profit of subsidiary companies before extraordinary item	887	603
Net earnings before extraordinary item	24,175	22,454
Extraordinary item *	608	567
Net earnings for the period	\$ 24,783	\$ 23,021
Net earnings per share		
— before extraordinary item	\$0.91	\$0.85
— after extraordinary item	\$0.93	\$0.87
Dividends per share	\$0.16	\$0.15

	(thousands of dollars)	
	Six months ended June 30	
	1977	1976
Sales	\$649,909	\$581,697
Cost of sales & operating expenses	575,969	508,253
Earnings from operations	73,940	73,444
Income from investments less interest charges	1,238	430
Earnings before underlisted items	75,178	73,874
Provision for income taxes	30,062	31,223
	45,116	42,651
Minority interest in net profit of subsidiary companies before extraordinary item	1,217	878
Net earnings before extraordinary item	43,899	41,773
Extraordinary item *	1,186	1,067
Net earnings for the period	\$ 45,085	\$ 42,840
Net earnings per share		
— before extraordinary item	\$1.66	\$1.58
— after extraordinary item	\$1.70	\$1.62
Dividends per share	\$0.32	\$0.30

Interim condensed consolidated statement of changes in financial position

Source of funds

	(thousands of dollars)	
	Six months ended June 30	
	1977	1976
Operations:		
Net earnings before extraordinary item	\$ 43,899	\$ 41,773
Items not requiring funds		
— depreciation	14,587	10,790
— other	5,884	2,804
	64,370	55,367
Extraordinary item*	1,186	1,067
Proceeds from sale of plant and equipment	405	6,563
Proceeds from long-term debt	502	—
	66,463	62,997

Application of funds

Expenditures for plant and equipment	18,273	18,172
Reduction of long-term debt	2,624	16,853
Dividends	8,470	7,941
Investments in affiliated company	—	2,345
Other investments	4,936	—
Other	1,850	1,817
	36,153	47,128
Increase in working capital	30,310	15,869
Working capital at beginning of year	315,030	291,549
Working capital at end of period	\$345,340	\$307,418

* Represents a reduction of income taxes arising from the use of prior years' tax losses of a subsidiary company.

John C. Lobb retires

John C. Lobb will retire as chairman, chief executive officer and a director of Northern Telecom, Inc. on September 30, 1977. He will continue as a director and consultant of Northern Telecom Limited and a director of Bell Canada.

Upon Mr. Lobb's retirement, Monson H. Hayes, Jr., president of the U.S. company since March 14, 1977, becomes chief executive officer and Walter F. Light, president of Northern Telecom Limited, will also be chairman of NTI.

Mr. Lobb joined Northern Telecom Limited in 1971 as president, later becoming chairman and chief executive officer. Early in 1976, at his request, he assumed the position of chairman, president and chief executive officer of the U.S. company to devote his full attention to developing and guiding the company's efforts in that fast-growing market. During the six years of Mr. Lobb's association with Northern Telecom Limited, sales almost doubled and earnings increased six-fold.

In announcing Mr. Lobb's retirement, Robert C. Scrivener, chairman of Northern Telecom Limited, observed that any analysis of Mr. Lobb's contributions to Northern Telecom should go beyond numbers. "What is not so obvious or easy to measure," he said, "is Mr. Lobb's legacy of dynamic management and a 'if-you-really-want-to-do-it, you-can-do-it' confidence. This will be with us and working for us long after the balance sheets of Mr. Lobb's years are history."

Turkish contract worth \$170 million

Northern Telecom Limited has signed a five-year contract with the Turkish Post, Telegraph & Telephone Administration (PTT) to supply an estimated \$170 million worth of telecommunications equipment and services to the government telephone system.

The contract, which runs through 1982, calls for the supply of parts and components for 800,000 lines of crossbar telephone exchange equipment, 750,000 telephone sets, associated telecommunications cable and engineering and technical supply services. These parts and components will be assembled with other parts and components produced in Turkey into switching and other products by Northern Electric Telekomünikasyon, A.S. (NETAS). The work of NETAS is expected to increase the value of the equipment by about \$250 million.

This is Northern Telecom's third such five-year contract signed with the Turkish PTT. The first two agreements, signed in 1967 and 1972, had an aggregate value in excess of \$100 million. During this period the waiting time for installation of equipment for a new subscriber has been reduced from 12 years in 1967 to about six years at present. Under the third phase of Turkey's development program, this will be reduced to about two years by 1982.

The \$170 million in equipment and services to be exported from Canada will require 4,300 man years of labor, or about 860 jobs a year, for Northern Telecom. Another 1,500 man years of labor, or 300 jobs a year, will accrue to some 1,500 Canadian suppliers.

European digital seminar

Northern Telecom Limited held in May its first European seminar on the evolution of telecommunications technology from analog to digital networks. Basil A. Beneteau, chairman of Northern Telecom International Limited, told the 40 senior executives from the telephone administrations of Denmark, Sweden, Finland and Norway attending the seminar in Copenhagen, Denmark, that Northern Telecom will spend at least \$100-120 million on research and development to complete its family of digital switching and transmission systems by 1980.

The high level of interest and participation of the attendees in the presentations and workshops on digital technology marked the seminar an unqualified success. Other presentations on Northern Telecom and the new digital products have been made recently in Iran, Saudi Arabia and Costa Rica.

William T. Simpson (left), president, Northern Telecom International and James C. Thackray (right), president of Bell Canada, discuss the SL-1 with B. Rishoe, of Jutland Telephone, of Denmark at Northern Telecom's first European digital seminar, held in Copenhagen.



Official plant opening in Saint John, N.B.

Northern Telecom Canada Limited officially opened a new subscriber equipment plant in Saint John, N.B. on June 27. The new facility consolidates operations previously scattered in three other locations in the province. The plant's operations include production of connector cable and repair and overhaul of telecommunications equipment.

The plant opening featured the unveiling of a commemorative

plaque by the provincial minister responsible for telecommunications, the Hon. Wilfred G. Bishop, minister of transportation.



Charles G. Millar (right), chairman of Northern Telecom Canada, and the Hon. Wilfred G. Bishop, New Brunswick's minister of transportation, are shown the forming of cable connector by Norma Murdoch at the Saint John plant's opening.

New telephone product line

A new distinctively designed line of telephone sets and accessories called Imagination* has been introduced in the U.S. market by Northern Telecom, Inc. Imagination will be introduced in Canada later this year.

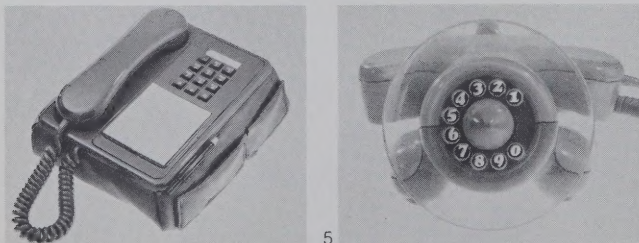
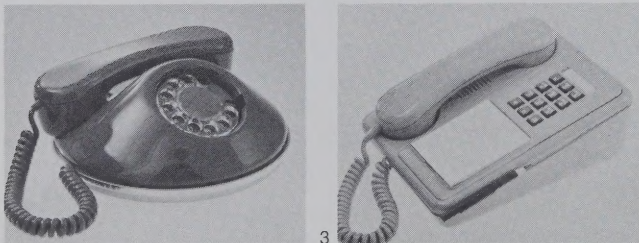
The first of the telephones introduced are Dawn*, Doodle* and Kangaroo*. Dawn's stylish shape should appeal to fashion-minded consumers. Doodle's rectangular base provides room for a handy note pad and pen or pencil. Kangaroo is the Doodle set with a beanbag-type base in denim, leatherette or corduroy with pouches along the sides for notes.

Another member in the Imagination line which will be available in Canada first is Nomad*. Nomad combines Doodle with specially designed furniture which will hold the telephone and provide storage space for such items as directories. It has a roll-top door and is equipped with casters for mobility. A novelty item, Alexander Graham Plane*, will be introduced soon. This telephone is designed like a propeller airplane with the dial mounted in the propeller.

The enthusiastic response to Imagination's introduction has caused NTI to increase substantially its sales forecast for this line.



1. Nomad
2. Dawn
3. Doodle
4. Kangaroo
5. Alexander Graham Plane



nt northern
telecom

**Northern Telecom
Limited**

1600 Dorchester Blvd. West
Montreal, Quebec
Canada H3H 1R1

second
quarter
1977

interim
report

AR18

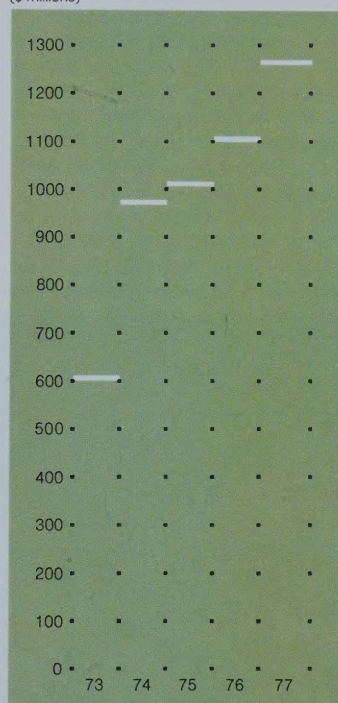
nt northern
telecom

Litho Canada

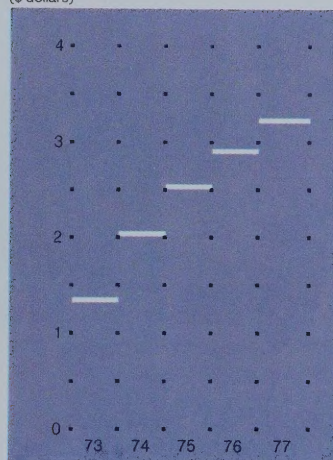
Financial highlights

	1977	1976
Sales.....	\$1,268,645,000	\$1,112,009,000
Net earnings.....	85,255,000	77,099,000
Net earnings per share.....	3.22	2.91
Dividends per share.....	0.66	0.61
Working capital.....	344,595,000	314,735,000
Capital expenditures.....	46,016,000	41,119,000
Shareholders' equity.....	468,601,000	400,816,000
Shares outstanding.....	26,469,494	26,469,494
Shareholders.....	7,191	7,436
Employees.....	24,962	25,277

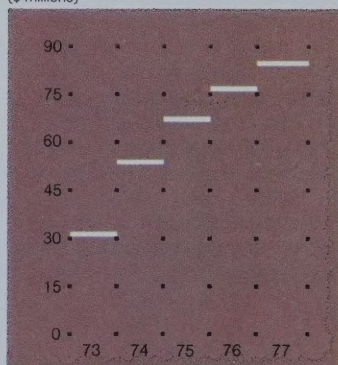
Consolidated sales
(\$ millions)



Net earnings per share
(\$ dollars)



Net earnings
(\$ millions)



Directors and officers

Directors

David W. Barr
Chairman of the Board
Moore Corporation Limited
Toronto, Ontario

*A. Jean de Grandpré, Q.C.
Chairman of the Board and
Chief Executive Officer
Bell Canada
Montreal, Quebec

Georges L. Demers, Q.C.
Senior partner
Demers, Gosselin and
Robitaille
Quebec City, Quebec

J. Douglas Gibson, O.B.E.
Chairman of the Board
The Consumers' Gas
Company
Toronto, Ontario

Donald S. Harvie
Chairman
Devonian Group
Calgary, Alberta

*Members of the
executive committee

Robert S. Hurlbut,
Chairman of the Board and
President
General Foods, Limited
Toronto, Ontario

*Walter F. Light
President
Northern Telecom Limited

John C. Lobb
Consultant
John C. Lobb Associates, Inc.
Singer Island, Florida

*Clifford S. Malone
President and
Chief Executive Officer
Canron Limited
Montreal, Quebec

Vernon O. Marquez
Consultant
St. Lazare, Quebec

*John H. Moore
Chairman of the Board
Brascan Limited and of
John Labatt Limited
London, Ontario

William L. Naumann
Former Chairman of the Board
Caterpillar Tractor Co.
Peoria, Illinois

Charles Perrault
President
Perconsult Limited
Montreal, Quebec

*Gerard Plourde
Chairman of the Board and
Chief Executive Officer
U.A.P. Inc.
Montreal, Quebec

*Robert C. Scrivener
Chairman of the Board and
Chief Executive Officer
Northern Telecom Limited

*James C. Thackray
President
Bell Canada
Montreal, Quebec

W. Maurice Young
Chairman of the Board and
Chief Executive Officer
Finning Tractor & Equipment
Company Limited
Vancouver, British Columbia

Officers

Chairman of the Board and
Chief Executive Officer
Robert C. Scrivener

President
Walter F. Light

Executive Vice-presidents
Basil A. Beneteau
Marketing

Donald A. Chisholm
Technology

James G. Stark
Finance

W.A. Thompson
Administration

Vice-presidents
Clive V. Allen
General counsel

Walter C. Benger
Market development

John W. Caffry
Finance

Roy T. Cottier
Corporate relations

J.D.M. Davies
Business development

Robert A. Ferchat
Controller

John D. MacDonald
Technology management

Edward B. Matthews
Business systems

Donald A. Noble
Manpower planning and
resources

Secretary
John T. Burnett

Treasurer
Stuart W. Henry

Report to shareholders

Sales and earnings reached new highs in 1977 despite indifferent business conditions and a controlled economy in Canada and varied economic conditions in most of the rest of the world.

Consolidated sales were \$1.269 billion, an increase of 14.1 percent over sales of \$1.112 billion achieved in 1976. Net earnings rose 10.6 percent to \$85.3 million from \$77.1 million in 1976. Earnings per share were \$3.22 compared with \$2.91 in the previous year.

Impact of Canadian economy

The lack of growth in the Canadian economy had a negative impact on the revenues of our major telephone company customers in Canada. Their growth in long-distance messages was retarded, as was the addition of new telephone installations. As a result, telephone company capital expenditures were lower than forecast, resulting in lower telecommunications purchases than expected.

In the face of these poor economic conditions, Northern Telecom Canada, the Canadian manufacturing company, still achieved higher sales revenues

new and traditional markets.

The slower Canadian economy and strong sales growth in the U.S. produced a significant change in the distribution of final telecommunications sales. Where, in 1976, the final telecommunications sales pattern was 81 percent in Canada, 12 percent in U.S. and 7 percent international, in 1977 it was 73 percent in Canada, 18 percent in U.S. and 9 percent in other markets. This trend to higher percentages of our total telecommunications sales being made outside of Canada is expected to continue and accelerate over the next few years.

International sales increase

Sales increased in all areas of international operations; in Europe, Asia, the Caribbean, Latin America and Turkey. In Europe, Northern Telecom Ireland delivered 115,000 Contempras to the French market. Under the terms of a new licencing agreement with La Société française des téléphones Ericsson, an affiliate of Thomson-CSF, the French company will commence production of the Contempra in 1978 for the French market, where it is estimated 14 million

joint venture with the Turkish government, is expected to increase the value of the equipment by about \$250 million.

The \$170 million in equipment and services to be exported will, over the five years, support some 860 jobs in Northern Telecom factories and a further 300 jobs in the plants of the company's suppliers in Canada.

The digital era

The Northern Telecom announcement last year of its move to digital switching and transmission products had an impact on sales of analog switching and transmission products. Some telephone companies in Canada and the United States which could have been expected to order SP-1 electronic switching equipment deferred such purchases in anticipation of digital equipment.

We regard this as a short-term condition. We believe that the pressure of growing communications demands in North America will bring about the purchase of new digital switching equipment as companies strive to meet customer demand, improve costs and service and offer new competitive features. We expect this to reflect itself in the near future in an acceleration of switching orders. The rate at which orders for the new Northern Telecom digital switching systems are being received indicates that this acceleration may already have begun. At year-end, more than 220 orders or commitments had been received for Digital Multiplex System (DMS) switching and transmission systems.

Digital commitments met

The time and product commitments the corporation made in May 1976 when it led the telecommunications industry into the Digital World continue to be met. The deadlines publicly established for the development of the full line of Digital Multiplex System switching equipment have been met or exceeded. Our commitment to have a full line of digital products by 1979 will be achieved.

The DMS-1, a digital multiplex subscriber carrier system and "remote switch" was field tested in 1976 and in operation with telephone companies in Canada and the U.S. by April 1977.

The first DMS-10, a small



Northern Telecom signed a third five-year supply contract with the Turkish PTT and continues to develop that nation's telecommunications network. Northern Electric Telekomünikasyon A.S. (NETAS) employs nearly 1,800, at its Istanbul plant. It is one of the largest manufacturing facilities in Turkey.

and earnings. Its earnings performance is a reflection of its continued improvement in efficiency and productivity, and the maintenance of its cost levels comparable with those of the best multinational competitors. These competitors have major advantages in cost of labor and in substantial government subsidies for export operations and research and development.

Sales distribution changing

Sales in the U.S. increased by 71 percent over the previous year. Northern Telecom, Inc., and Cook Electric Company, both showed strong growth in

telephones will be needed over the next five years.

Northern Telecom signed its third five-year contract with the Turkish Post, Telegraph and Telephone Administration. The new contract, which runs through 1982, is to supply an estimated \$170 million of switching and subscriber equipment components, associated cable and engineering and technical supply services. These parts and components, with other parts and components produced in Turkey, will be assembled into switching and other products by Northern Electric Telekomünikasyon, A.S. (NETAS). NETAS, our

digital central office switch, with a range of from 300 to 6,000 lines or more, was installed in the Fort White office of the North Florida Telephone Company in late October. Because of its size range, we believe the DMS-10 will enable us to substantially increase our sales to U.S. independent telephone companies.

The DMS 100 and DMS 200, large local and toll central offices with capacities of 100,000 lines and 60,000 long distance circuits, completed



Top left
Technicians view video outputs indicating the overall performance during field trials of a DMS 100/200 system. Irregularities in the system are detected immediately by its programmed self-diagnostic feature, and can often be traced to the specific circuit card causing the problem.

Top center
The new Citicorp Center in New York City is served by the SL-1 digital business communications system. Citicorp was one of more than 30 commercial or institutional customers in the U.S. to purchase the SL-1 directly from Northern Telecom in 1977.

field trials in the closing months of 1977. Systems will be shipped to customers in Canada and United States in 1978.

DMS 300, one of the largest digital switches under development by any company, is being designed as a major international gateway switch. The first order, valued at \$11.8 million, has already been received and the system is expected to be in operation by November 1979. This system will provide the interface between Canada's domestic telephone system and the worldwide telecommunications network.

The SL-1 digital business communications system, which proved the viability of digital switching in a private automatic branch exchange, continues to establish itself as the technological trendsetter. By year-end, more than 400 systems had been sold or were on order in Canada, the United States and in international markets.

DMS to outperform SP-1

We believe the market performance of our new digital switching products will surpass that of the SP-1 electronic analog system which, in short order, established itself as the market leader in Canada and with the independent telephone companies in the United States. It took \$89 million in research

and development expense to develop the SP-1. To date, Northern Telecom has sold, or has on order, 213 SP-1s or SP1Es, an enhanced model, or



about 1.8 million lines, of which 166 units, or about 1.4 million lines are in service. We have sold, or have orders for, about 180,000 trunks and nearly 1,500 Traffic Operator Position Systems (TOPS). Total sales and orders of all SP-1 products, since introduction in 1971, is more than \$800 million.

DMS digital switching systems have an infinitely greater market than do electronic analog systems, in both the telephone company market and the private systems market. Digital systems can bridge the gap from analog and digital for even the smallest telephone company, making the latest telecommunications technology available to every telephone subscriber. Digital systems are the only technology by which telephone companies can share fully in the rewards and advantages of the semiconductor and software technologies.

The demands of the consumer for continued improved service, more features with less

inflation are leading the telephone companies towards digital technology and digital products. A similar condition holds good in the private systems market. Digital systems provide the greatest reliability, least maintenance, most service and features for the major corporations and institutions in the United States and elsewhere which wish to own and operate, rather than lease, their internal telephone systems.

Digital competition

The advent of the digital era in telecommunications has created a new group of competitors for us, particularly in the private automatic branch exchange (PABX) and switching fields. Most of these new competitors have been successful in other areas of electronics, and some are concentrating on a small part of the total market, whether that market be switching, transmission or PABXs. None of these new entrants has the experience, the product reliability record, the telecommunications R&D resources and reputation, or the plans for as complete a line of digital equipment, as Northern Telecom.

We expect to achieve the same North American leadership in digital switching that we achieved in electronic switching.

New software opportunities

At the heart of digital communication are integrated circuits and software technologies. Both of these have reached a high-art stage in sophisticated design and innovation. Yet, both



can be said to be in their infancies. The technological breakthrough which permitted the practical application of digital technology to telecommunications was the large-scale integrated circuit developed in the early 1970s. The further development, application and refinement of LSIs is expected to continue for many years, providing cost savings and reliability factors many orders of magnitude above today's gains. The application of integrated circuits and software to telecommunications will provide systems and equipment with a much wider range of services than are available today.

Public demand for more information, for new types of information as well as growth of the information infrastructure — whether for business, medical application and research, education, entertainment, or other uses — will create new markets for telecommunications manufacturers. These new markets are already becoming evident in the U.S. where technology is permitting the deregulation of certain aspects of the telecommunications industry.

The interaction between information processing and information transmission is accelerating. Computers and telecommunications networks will work even more in tandem in the future to service new demands for information of every kind. These demands will generate a proliferation of new equipment and services which, in turn, will create many new opportunities to develop both hardware and software. Telecommunications as well as computer companies will share in this growth.

Northern Telecom has been a leader in the development of integrated-circuit and software technologies in telecommunications. The creation of B-N Software Research, to complement Bell-Northern Research, was another step in our continuing program to maintain leadership in the technologies of the future. We believe that the software technologies and systems that will be created by B-N Software over the next few years will have as great an impact on the telecommunications industry and the company as have the stream of trend-setting and market-leading products that have been created over the past decade by BNR.

High R&D investment

We continue to commit a substantial part of our financial and manpower resources to research and development. Bell-Northern Research now employs 2,183, an increase of 180 over last year. The largest proportion of this increased R&D manpower has gone into the BNR laboratory at Palo Alto as part of an accelerating program of development of new products for the U.S. market. In addition to BNR, there are another 114 in B-N Software Research working on software development.

We spent \$68.5 million on research and development in 1977. This is 11.4 percent higher than in 1976 when the total was \$61.5 million. We will need to invest increasingly higher amounts in R&D as far ahead as we can see in order to remain competitive in products and prices. The higher costs of operating in Canada make doing so extremely difficult.

Such an investment in R&D is necessary to maintain our position in our domestic market and to increase penetration in the United States and the international markets at an expected rate of 20-to-25 percent a year.

technology is turning the R&D focus now to projects and products that will have to provide a high return over a much shorter payback period, such as two or three years. This is a reflection of future markets and how we must be able to compete in them.

The consumer is playing a more dominant role in the telecommunications market, in his home and in his business. As this trend continues, combined with a far more rapid rate of technological change, the turn-over life of the products he uses will become shorter. We are now directing substantial R&D resources to these new product areas, such as the digital telephone, total communications products for the North American "office of the future" and new product applications of the semiconductor and software technologies.

R&D tax credit

We were pleased to see the five percent tax credit for R&D in the 1977 Canadian budget, even though its financial impact was much less than those of the programs previously cancelled by the federal government.

We have been saying for the



Over the past decade, we have spent nearly \$400 million on R&D for new products, product re-design, new manufacturing processes, new systems and the development of new technologies.

Because of this investment, sales of proprietary products have accounted for a steadily increasing percentage of manufacturing sales; rising from 8.4 percent in 1969 to 71 percent in 1977.

Shorter payback periods

Much of this investment has been in products with relatively long payback periods. New

past year, and believe that it bears repeating at least once more, that such a tax credit is inadequate for the massive injections of innovation in new products and new manufacturing processes and skills that are the urgent need of the Canadian economy and its manufacturing industry.

Bearing in mind that the actual financial impact on any company is only about half of the actual tax credit, it is our strong and declared belief that a minimum tax credit of 25 percent is required to even begin to move the Canadian economy out of its present uncompetitive

Left
Northern Telecom continued to host digital seminars around the globe in 1977. Pictured here at an Ottawa seminar for ministers and senior officials of the Canadian federal government is Communications Minister Jeanne Sauvé (left) testing features of the SL-1 system with Northern Telecom president Walter F. Light.

Right
A BNR technologist carefully performs a failure analysis of an integrated circuit. Bell-Northern Research has been in the forefront of development of large-scale integrated circuits.

Top right

Four new Canadian plants were opened in 1977, including three in the Atlantic provinces. Attending official opening ceremonies at the Amherst, Nova Scotia cable plant were, from left, A.A. Brait, president, Newfoundland Telephone Company, Gerald Regan, Nova Scotia premier, W.S. Robertson, president, Maritime Telephone Company, and Northern Telecom Canada's chairman and president, Charles G. Millar.

Below

The ability of hair-thin glass fiber to transmit sound and data in the form of light has been under intensive research by BNR and Northern Telecom for the past five years. Field trials are now underway using glass fibers manufactured by Northern Telecom Canada which has formed an optical systems division to manufacture and market fiber optics communications systems.

condition. We also believe that such a credit is required for a minimum of 10 years if it is to have any lasting effect on manufacturing enterprises and if the Canadian industrial climate is to be changed enough so that it once again becomes attractive to non-Canadian manufacturers to establish R&D centers and new industries here.

Capital expenditures

Our investment in new manufacturing facilities and equipment in key markets and for key products continues apace. Capital expenditures in 1977 totalled \$46 million. Over the past decade we have invested \$279 million in new plants, new machinery and equipment,

operations improved at a rate more than twice that of the manufacturing industry as a whole. The principal elements of this improvement were also present in our U.S. factories.

A full discussion of the corporation's productivity improvement programs can be found on pages 10 to 15.

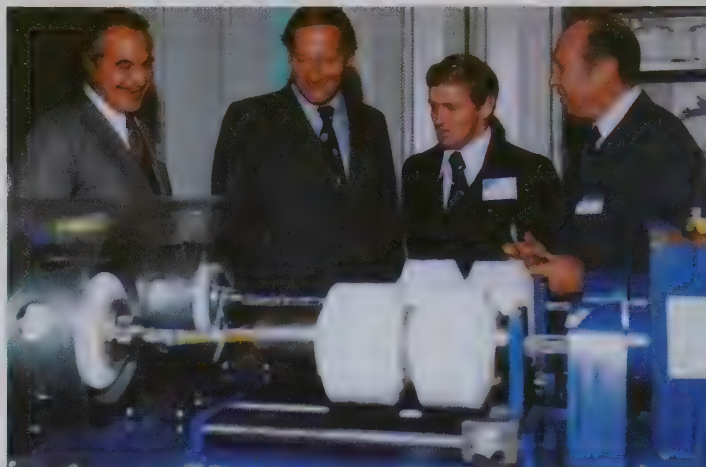
New plants in U.S., Canada

To meet the demands for sophisticated printed circuit boards (PCBs) and printed

common-carrier network markets. Danray will be operated as a division of Northern Telecom, Inc.

We purchased 24 percent of the issued voting stock of Intersil, Inc. for \$11.6 million. Intersil, based in Cupertino, California, is a major developer and manufacturer of semiconductors, large-scale integrated circuits and computer components and subsystems.

New and future developments in semiconductors,



circuit packs (PCPs) used in the SL-1, DMS-1 and DMS-10, the PCB plant at West Palm Beach is being doubled in size from 50,000 to 100,000 square feet. The new facility is expected to be complete by March 1978.

In Canada, two new cable plants were officially opened in Amherst, N.S. and Regina, Saskatchewan. A new switching products plant was opened at Charlottetown, P.E.I., and a new subscriber equipment plant was opened in Saint John, N.B. The new Saint John plant consolidates operations previously carried out in three other locations in the province.

Acquisitions

To expand our telecommunications product line and to participate in the potentially large market for distributed data processing terminals and systems, we have invested in or acquired companies with excellent management and established positions in their markets. These markets are evolving from technological developments in large-scale integrated circuits and software.

We acquired, for US\$23 million, Danray, Inc., a Dallas, Texas-based producer of telephone switching equipment, whose products will complement our current lines, and assist in sales to the rapidly expanding corporate and

especially LSI's are creating a whole new series of products for remote or distributed data processing. The resulting evolution of corporate business systems will include their connection to corporate communications networks. We see market potential of great value in the blending together of communications and data processing technologies in the "office of the future".

In this context, we purchased in December, 1977, one million shares, about 12 percent of the common shares and common share equivalents, of DATA 100 Corporation of Minneapolis, Minn., at US\$15 a share. We have an agreement with DATA 100 that we may buy up to 35 percent of that company's shares. DATA 100, with sales of US\$122 million in 1976, develops, manufactures and sells remote job entry computer terminals.

We also have a definitive agreement with Sycor, Inc., of Ann Arbor, Michigan to acquire that company by an exchange of stock—nine-tenths of a share of Northern Telecom stock for each Sycor common share, with a minimum price of US\$22 per Sycor share. Sycor designs, produces and markets intelligent terminals for distributed data processing. Its revenues in 1977 were US\$76.8 million.



new business systems, new processes, new physical distribution facilities and equipment in a corporation-wide drive for improved productivity.

These have been excellent investments. They have helped us create a record of productivity improvement which is unrivalled in Canadian industry and by few companies elsewhere. Over the period, 1970 to 1977, the productivity of our Canadian manufacturing

Far right

The company's first European digital seminar was held in Copenhagen, hosting senior officials of Nordic telephone administrations. Inspecting the DMS-1 display (from right) B.A. Beneteau, chairman, Northern Telecom International Limited, and Dr. D.A. Chisholm, executive vice-president, technology, Northern Telecom Limited, chat with O.H. Giese of Jutland Telephone and P. Sterndorff of the Danish Telephone Administration.

Management and organizational changes

John C. Lobb, who more than any other individual, helped create the current style, form and direction of Northern Telecom, retired as chairman, chief executive officer and a director of Northern Telecom, Inc., on September 30. He continues as a director and consultant of Northern Telecom Limited.

Mr. Lobb joined Northern Telecom Limited in 1971 as president. He later became chairman and chief executive officer. Early in 1976, at his request, he assumed the position of chairman, president and chief executive officer of NTI to devote his full attention to developing and guiding the company's efforts in that fast growing market.

Monson H. Hayes, Jr., appointed president of the U.S. company in March, 1977, assumed the additional responsibilities of chief executive officer. Walter F. Light, president of Northern Telecom Limited, is now also chairman of Northern Telecom, Inc.

In Canada, two new corporations were formed last year. They are part of a decentralization program designed to divorce corporate management from the daily operations of the business and to permit it to devote its full time to the development of the business on a global basis.

Northern Telecom Canada

Charles G. Millar, executive vice-president, operations, was appointed chairman, president and chief executive officer.

Northern Telecom International Limited was established to direct the company's manufacturing and marketing activities outside of North America. It is based at corporate headquarters in Montreal. Basil A. Beneteau, appointed executive vice-president, marketing in March is also chairman of the new company. William T. Simpson, vice-president, international was appointed president.

A chart showing the corporation's worldwide organization and its principal subsidiaries is on page 8. The management of the subsidiaries is shown on page 9.

The future

Telecommunications is a long-term, rapid-growth, fast-changing industry. It is not cyclical, though it is obviously affected by the strengths or weaknesses of national and world economies. The dip in spending growth by Canadian telephone companies must be placed in the perspective of the long-term growth that is inherent in the North American telecommunications industry.

Although it was not as strong as expected, Canadian telephone company capital expenditures last year, are still estimated to have been about \$1.9 billion. In the United States, capital expenditures by

capital expenditures will rise to \$25 or \$26 billion by 1985.

Growth in Europe is expected to exceed that of North America and it has been forecast that within the next three or four years, Europe will pass North America in the number of telephones.

Notwithstanding the higher rates of growth in Europe and such places as the Middle East, North America will still remain the largest single telecommunications market in the world. It is Northern Telecom's primary market and we expect to grow in the U.S. section of it at a rate of 20-to-25 percent a year.

We expect also to obtain our share of the increased growth in the European market by licensing of a number of our products and by joint ventures. We expect to see a growth rate overseas of about the same scale as in the United States; 20-to-25 percent a year.

Northern Telecom is strategically positioned to take advantage of the growth in both of these major markets. We have R&D resources which have proven themselves the equal of any in the world in their ability to produce innovative, trend-setting products across the whole telecommunications spectrum. We have carefully, over the past half-decade, developed a management group that is capable of operating in almost every telecommunications market on equal terms with our competitors.

We have developed product lines that have established reputations for reliability second to none and which have always been dedicated to the customer's interest of improved productivity, increased services and features and reduced operating cost. With these products, we have developed a sales volume that gives us a base from which we can realistically and effectively tackle the major international markets.

While accomplishing all this, we have established a sound financial base from which, either through internally generated capital, or from our substantial, and relatively untouched, borrowing power we can continue to expand through internal growth or from acquisitions, particularly in the U.S. As we achieve this growth we will have the opportunity to increase our return on investment as the product mix of our sales changes to adapt to the new and fastest-growing segments of the world market.



Limited was established to manage the company's Canadian manufacturing and marketing operations. It is headquartered in Islington, Ont., in Metropolitan Toronto.

telephone companies held firm and are estimated to have been close to \$14.5 billion; a total for North America of \$16.4 billion. Some recent studies estimate that these North American

Robert C. Scrivener
Chairman of the Board and
Chief Executive Officer.

Walter F. Light
President

February 24, 1978

Northern Telecom Limited and principal subsidiaries

The manufacturing, marketing, distributing and R&D operations of Northern Telecom Limited are managed by subsidiaries located around the world.

The Northern Telecom family of companies represents assets of \$811 million, 44 manufacturing facilities with a total floorspace of six million square feet and 24,962 employees.

The largest subsidiary is the Canadian manufacturing company, Northern Telecom Canada Limited. It manages 26 plants in nine provinces and occupies 4.8 million square feet of manufacturing space, or 80 percent of all Northern Telecom manufacturing space. Northern Telecom Canada is one of the country's largest manufacturing companies. It employs 15,148 and produces a complete range of telecommunications equipment and systems for the Canadian market as well as supplying

parts, components or finished goods to Northern Telecom companies and customers in other countries.

In the United States, Northern Telecom, Inc. is one of the leading suppliers of electronic switching systems to the independent telephone market and a leading force in the conversion to digital systems in the U.S. It employs 4,048 and occupies 892,000 square feet of manufacturing space with 14 plants in nine states.

Northern Telecom International Limited directs the company's manufacturing and marketing operations outside of North America. Its 2,293 employees are located in Turkey, the Republic of Ireland, and Malaysia as well as in sales offices in Switzerland, France, England, West Germany, Hong Kong and Singapore.

Nedco Ltd. is the largest Canadian distributor of electrical, electronic, industrial and telecommunications products in Canada. Its 858 employees operate from sales

offices and warehouses in more than 40 Canadian cities in every province in Canada.

Northern Telecom's principal research subsidiaries are Bell-Northern Research Ltd. and B-N Software Research Inc.

Bell-Northern Research is Canada's largest private industrial research and development organization employing close to 2,000 scientists, engineers, technicians and support people in five laboratories in Canada. Its principal subsidiary, BNR Inc., employs nearly 200 in its laboratory at Palo Alto, California.

B-N Software Research Inc. employs 114 specialists and support people. Its prime function is the development of software applications for telecommunications.



This chart is not intended to denote the legal or parent-subsidary relationships. It reflects the administrative organization of the corporation.

Officers of principal subsidiaries

Bell-Northern Research Ltd.

Chairman of the Board
Donald A. Chisholm

President
C. Denis Hall

Vice-presidents
L. Colin Beaumont
Digital switching systems

John Elliott
Transmission development

Harvey S.W. Goodwin
Administration

Robert Kenedi
Switching development

Eugene B. Lotochinski
International

Lloyd Taylor
Technology

R. Charles Terreault
Systems

Treasurer and Controller
Frank T. Chaikowsky

Secretary and Legal Counsel
Roger W. Hacker

B-N Software Research Inc.

Chairman of the Board
James C. Thackray

President
John H. Aitchison

Vice-presidents
James G. Reddy
Finance and administration

Dr. C. David Sadleir
Development

Secretary
Peter J. Knowlton

Cook Electric Company

President
John H. Mangle

Executive Vice-president
Thomas P. Hudock

Vice-presidents
Herbert W. Lefaiver
Industrial relations

Roy C. Schotland
Operations

Earl L. Washburn
Engineering

Controller
George H. Hoffman

Treasurer
John J. Nash

Secretary
Richard R. Standel, Jr.

Nedco Ltd.

President and
Chief Executive Officer
Robert H. Lane

Vice-presidents
John J. Christie
Finance

J. Maurice Macé
Corporate relations

Leslie J. Payne
Personnel

Controller
Eugene A. Koeltz

Treasurer
Stuart W. Henry

Secretary
John T. Burnett

Northern Electric Telekomunikasyon A.S.

Chairman of the Board and
Managing Director
Robert R. Watt

General Secretary
Iskender N. Taner

Northern Telecom (Asia) Limited

Managing Director
Mendel C. Cohen

Deputy Managing Director and
Controller
Brian A. Robson

Northern Telecom (CALA) Corporation

President and General Manager
Jean-Paul Gagnon

Northern Telecom Canada Limited

Chairman, President and
Chief Executive Officer
Charles G. Millar

Senior Vice-presidents
William J. Pardy
Administration

H. Lloyd Webster
Marketing and Technology

Group Vice-presidents
Ewart O. Bridges
Switching

Kenneth H. Woodley
*Subscriber equipment and
outside plant*

Vice-presidents
Clare A. Anderson
Western Canada

André J. Boutin
Cable

Robert M. Cuddy
Manufacturing

Richard A. Fortier
Personnel and industrial relations

Ronald A. Hunter
Controller and Treasurer

Roy Merrills
Apparatus

William W. Tinmouth
Secretary and general counsel

Elliott Turcot
Advanced switching

David G. Vice
Transmission

Northern Telecom A. G.

Managing Director
Hugh A. Hamilton

Northern Telecom, Inc.
Chairman of the Board
Walter F. Light

President and
Chief Executive Officer
Monson H. Hayes, Jr.

Group Vice-presidents
Charles J. Graham
Products

Robert N. Parker
Business communications

Thomas R. Worthy
Telephone companies

Vice-presidents
William C. Cawthon
Manufacturing

Eugene B. Lotochinski
Technology

John MacDonald
Finance

Herbert H. Phillips
Administration

Clifton W. Sink
Marketing

Richard R. Standel, Jr.
General counsel and secretary

Northern Telecom Industries Sdn. Bhd.

Managing Director
Gerald G. Jones

Deputy Managing
Director and Controller
Ho Boon Theam

**Northern Telecom
International Limited**
Chairman of the Board
Basil A. Beneteau

President
William T. Simpson

Vice-president
Jean-Paul Gagnon

Treasurer
Stuart W. Henry

Secretary
John T. Burnett

**Northern Telecom
(Ireland) Limited**
Chairman of the Board
Lord Killanin

Managing Director
Harry M. Coumans

Zenronics Ltd.
President and
Chief Executive Officer
Richard J. Hammond

Secretary
John T. Burnett

Innovation and productivity: keys to market success

1977 was the fifth successive year in which Northern Telecom increased consolidated sales. They have more than doubled since 1972. Net earnings have quadrupled in the same period.

This growth is particularly significant when viewed against business trends in Canada, where manufacturing, as a percentage of the gross domestic product, has declined 18 percent over the past decade.

Canadian manufacturing wages, historically lower than those in the U.S. to compensate for a lower rate of productivity, have risen sharply and now exceed those paid in the U.S. In 1976, average hourly earnings in Canada were nearly 12 percent higher than the U.S. average; productivity, output per person employed, was estimated by the Economic Council of Canada to be 20 percent lower in Canada.

Innovation is a recognized key to successful national industrial strategies and high employment. Technology creates new jobs, raises productivity, reduces inflationary pressures and improves living standards. Yet, tax incentives

that opened markets for the corporation all over the world; second, by achieving annual corporation-wide productivity gains matched by few companies anywhere; and third, by strict monitoring and control of costs.

The constant year-by-year increase in productivity was achieved by a total corporation-wide dedication to the task and large infusions of capital, plus Canada's largest corporate expenditures on industrial research and development.

No single element of corporate activity was responsible for the productivity gains. They came from the planned relationships of: new plants and equipment in Canada and the United States; new manufacturing processes; new products designed for maximum manufacturing advantage; the re-design of existing products; new business systems; new management techniques; revamped procurement policies and programs; major changes in physical distribution; cost reduction programs for all activities, all products and all levels of management; special

innovation and capital, the productivity program makes it possible for the corporation's employees to produce more during the same work period and, more often than not, it makes the task easier to perform and improves the working environment.

The nature of the electronics and telecommunications industries insists that every participant seek and take advantage of new technologies. To fail to do so would create an inability to meet competition in existing markets and a lack of new products with which to enter new markets.

The constant investment of tens of millions of dollars annually in research and development ensures that the corporation will remain ahead of its competition with new technology. This, in turn, ensures that the jobs of thousands of the corporation's employees will not be overtaken and eliminated by the new technologies of the corporation's international competitors.

As new technologies are developed, there is often a



and grants for industrial R&D, widely used in competing countries, have been sharply curtailed in Canada.

Three-pronged strategy

Though such obstacles have severely inhibited many Canadian-based manufacturing companies, Northern Telecom has succeeded despite them: first, by developing a continuous stream of innovative, trend-setting products

seminars and employee/management training techniques.

An investment in jobs

While the primary impetus for the corporation's continuous program of productivity improvement is to enable it to remain competitive (for without this there is nothing), its major impact on the Canadian economy is through the jobs that it creates and maintains.

Through the partnership of

transition period in which jobs may be reduced rather than created. The workforce also changes character; as is happening in the telecommunications industry where "knowledge workers" are taking the place of manual workers. This trend to more knowledge workers will increase as new technologies and systems become even more sophisticated, and software becomes as important, or more impor-

tant, than hardware.

Over the long-term, the impact of technology and change throughout all industry is to create more jobs and more opportunities for new enterprises, with high-technology companies growing at many times the rate of low-technology companies.

The \$68.5 million was the largest single corporate outlay for industrial research in Canada during 1977, and represented a 11.4 percent increase over 1976. Average investment by Canadian industry in R&D has been declining since the 1960s. It is currently about seven-

With huge investments in highly skilled staffs, and the new facilities and equipment required, every available means is used to eliminate waste and blind alleys. In Canada, where there is comparatively little government support of industrial R&D, research costs are part of the ultimate price that users pay for service and products.



New factories

Significant productivity gains were obtained through a Canada-wide program of new plant construction and a move out of obsolete facilities. In Montreal, all but the lower floor of the eight-story Shearer Street plant, the corporation's "mother house" since 1914, was vacated by 1976. Four replacement facilities were built in the Montreal area. Nine other plants were built in seven other provinces. Each is a modern, single-storey, industrially engineered plant, equipped with the most advanced production and testing machinery.

Current manufacturing floor space across Canada is 4.8 million square feet vs. 4.7 million in 1970. Annual production in terms of manufacturing space occupied is now \$172,000 of gross sales per square foot, excluding sales tax, compared to \$84,900 per square foot seven years ago.

Top Canadian R&D expenditures

Central to the corporation's high productivity gains are the size and scope of its product research and development activities. It has spent close to \$400 million on R&D in the last decade. In 1977, Northern Telecom spent \$68.5 million on R&D, 63 percent of it through its subsidiary Bell-Northern Research Ltd., Canada's largest industrial research organization. The balance was spent by plants and divisions on product development and manufacturing processes.

tenths of one percent of sales, about nine percent of Northern Telecom's current R&D level of expenditure per manufacturing sales dollar.

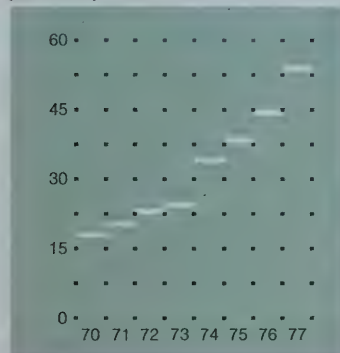
Productivity, or return per dollar invested, is a key consideration in innovation programs. The research and development process for major telecommunications systems is often complex and costly, and the return long-term. For example, R&D for Northern Telecom's highly successful SP-1 electronic switching system began nine years before its 1971 commercial introduction. Total R&D expenditures to develop the SP-1

Tri-corporate relationship

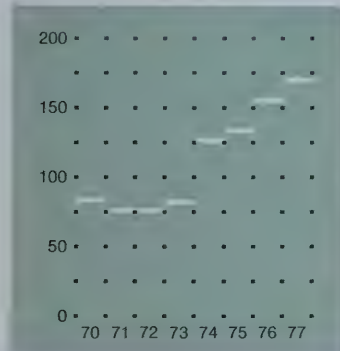
Here the close association between Northern Telecom, Bell Canada and Bell-Northern Research proves its value. Indeed, without it, it would be difficult, if not impossible, for Northern Telecom to stay competitive with an R&D budget that is only one-quarter or one-fifth as large as those of larger international telecommunications organizations with which it competes.

The three companies consult on a daily basis. Interactions between scientific, engineering, production, marketing and operating people begin at the earliest planning and concept stages for each new product. They continue through development—engineering, manufacturing, field trials and installation. Performance data, monitored and evaluated for each piece of equipment in service provides the basis for future improvements and for the design of more advanced

Sales per employee (Canada)
(\$ thousands)



Sales dollars per manufacturing square foot (Canada)
(\$ thousands/excluding sales tax)



Top
Employees at the 750,000 square-foot switching plant in Brampton, Ontario, assemble central office switching frames. The company's new DMS 100 and DMS 200 digital local and toll switching systems are also being produced here.

Bottom right
Engineers from Northern Telecom, Bell Canada, and Bell-Northern Research carefully examine the detailed network of a fiber optical receiver. Daily exchange of technological know-how among the three companies is a key element contributing to the strength and success of the tri-corporate organization.



were \$89 million. Sales of SP-1 products to date exceed \$800 million.

Similarly, R&D was initiated around 1969 for the corporation's Digital Multiplex System switching machines that are now being introduced. Total expenditures for the DMS family are expected to exceed \$120 million by 1982.

systems when new technological developments make them practical. Research and development at BNR is "market-driven" with clearly defined goals for each project. Each product is designed to provide the maximum manufacturing productivity advantage as well as the maximum in operating economics and

service improvement to telephone companies.

This approach has enabled Northern Telecom to anticipate market needs consistently and accurately, to get an early start on development and to come out with a very high ratio of winners in its product portfolio. The winner's list is a long one, beginning in the 1960's with such products as the Contempra telephone set and Pulse business communications system and covers every major category of telecommunications equipment.

In 1964, only one percent of Northern Telecom's product lines were developed in-house. In 1977, 71 percent of the products manufactured were designed by BNR and Northern Telecom's in-plant research laboratories.

Each new product solved

real telephone company problems and enjoyed excellent response, particularly in the highly competitive U.S. and overseas markets. Probably the most widely dispersed innovation is the electret microphone which appears in Northern Telecom's Venture headset, Companion handsfree speaker units and SL-1 telephone sets. The electret microphone is used under license by manufacturers of tape recorders and other audio apparatus throughout the world.

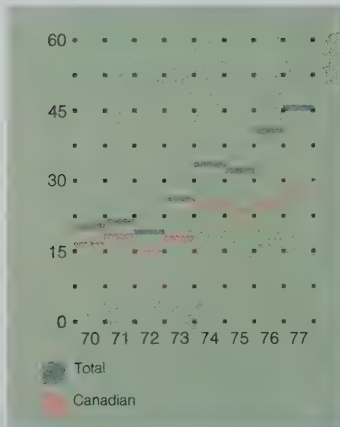
Manufacturing R&D

Major portions of the corporation's R&D efforts are devoted to keeping up-to-date with current technology and applying that technology to production needs. About 30 percent of the R&D budget goes

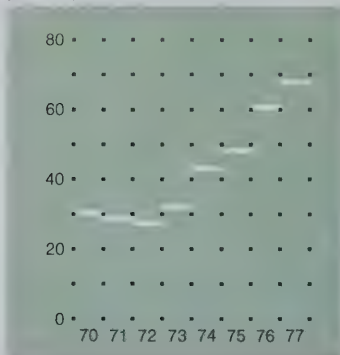
towards reducing costs and improving manufacturing machinery and processes. The company's Manufacturing Research Center, with a staff of about 115, is directly concerned with increasing productivity and plant operations as well as maintaining the quality and reliability of products and components.

The increasing use of solid-state technology, integrated circuits and software, in such new products as Northern Telecom's Digital World family, promise significant future cost savings in materials and in manufacturing productivity gains. Solid-state technology permits smaller and vastly more versatile systems, and makes possible more extensive automation than is the case with electro-mechanical equipment.

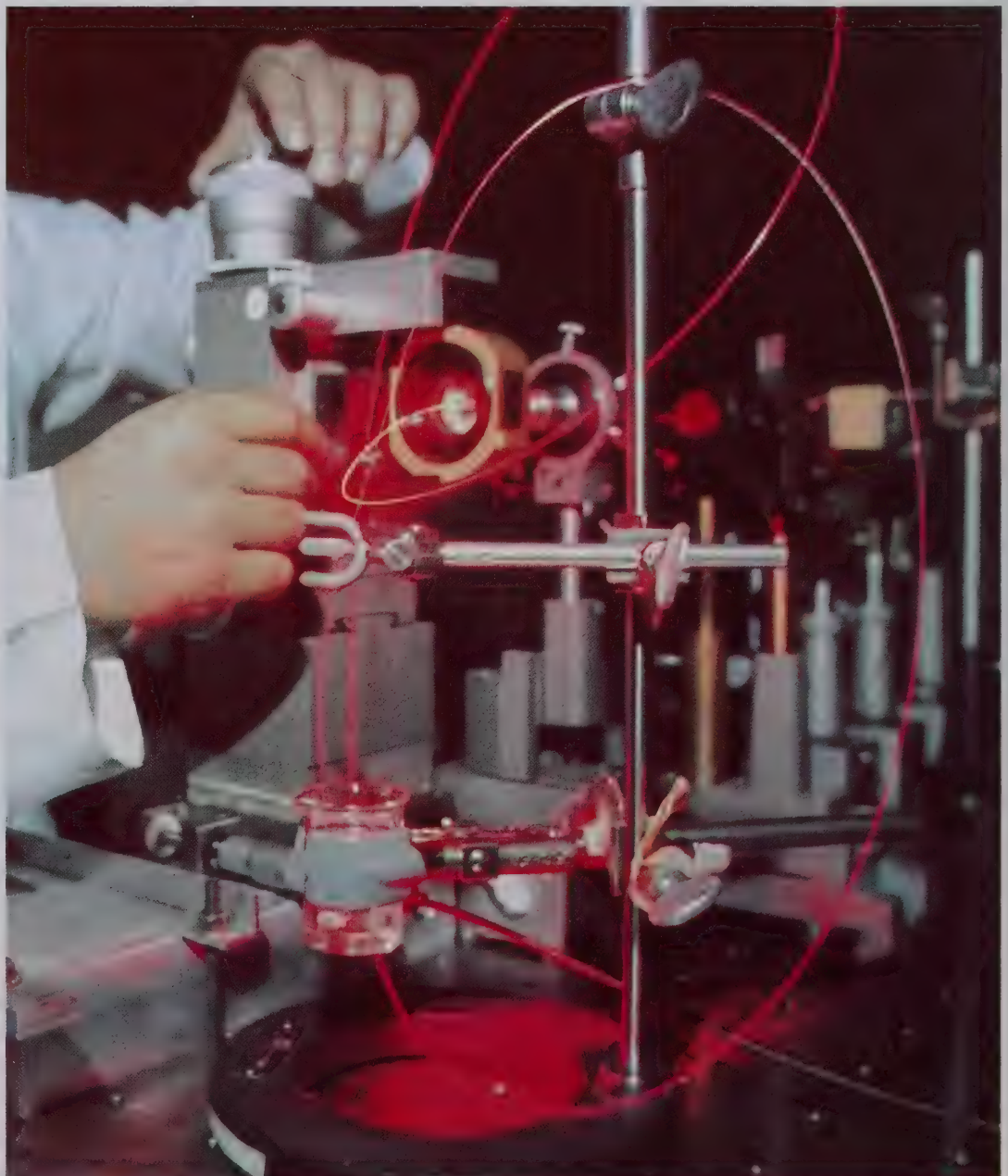
Capital expenditures
(\$ millions)



Research and development
net expenditures
(\$ millions)



Skillful hands of a BNR technician carefully take an index profile measurement of an optical fiber. Field trials testing the performance of fiber cable under normal telecommunications conditions began at Bell Canada facilities in Montreal in October 1977.

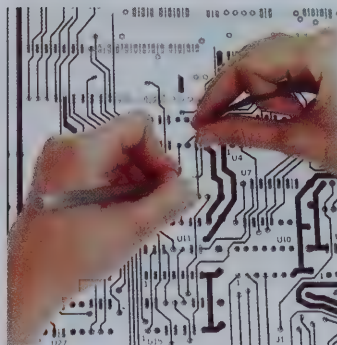


Printed circuit boards (PCBs) no larger than this page, for example, can carry complex circuitry that would require rows of shelving with older technologies.



In assembling the boards, automatic component sequencers and inserters, wave-soldering machines that can solder multiple leads and connections for an entire board in one pass, plus computer-controlled automatic test equipment, all guided by skilled technicians, have considerably reduced the need for hand labor and greatly increased the accuracy and reliability of PCBs produced in plants in Aylmer and St. Laurent, Quebec, and West Palm Beach, Florida. Largely automated lines set up last year at West Palm Beach at a capital cost of more than \$1 million, for example, have boosted output more than five times that of manual procedures formerly used.

Demand for printed circuit



boards and packs will certainly grow. Northern Telecom's DMS digital switching and transmission systems are entirely solid-state as is the SL-1 business communications system. Solid-state circuits are going into many other products as well, including the new electronic telephone set expected to be introduced towards the end of 1978.

Re-design for productivity

Re-design of existing systems and apparatus is carried on continuously. The model 500 or standard electro-mechanical telephone set introduced in 1954, is one example. A cost reduction team from the London, Ontario plant and Bell-Northern Research, went to work on it in 1973. The electro-mechanical assembly in the base was changed to a printed circuit board, which lends itself to automated assembly methods, eliminating expensive manual operations. Furthermore, the PCB was designed to be universal so that the same unit could fit other sets, including Contempra and Logic, and production runs could be extended for further unit cost savings. The receiver mechanism was changed to utilize a device called a balanced armature mechanism that cut material requirements and simplified assembly.

In four years, these and numerous other modifications reduced overall costs by 20 percent which enabled the corporation to keep price increases to a minimum despite significant increases in both material and labor costs during the same period. Northern Telecom manufactures about 500,000 model 500 sets a year in a variety of types, including special humidity-protected versions for the Caribbean and other tropical areas.

Impact on switching costs

Since its introduction in 1971, the SP-1 electronic computer-controlled switching system has also gone through a continuous enhancement process taking advantage of new technological developments to improve its processor memory units, trunks and many other components. The central control complex on the latest version occupies only one-seventh the floor space required by the earlier systems. Production and assembly costs have been significantly reduced.

Underscoring the impact that new technology can have on costs, the corporation's new DMS family of digital switching systems offers further productivity gains in every phase of manufacture through to installation and operation. Time required to engineer a 2,000-line central switching office with DMS-10 instead of SP-1 has been cut. Final assembly labor is about 40 percent of that required for SP-1.

Examination and re-examination of products and processes is carried out continuously to determine every possible saving. Only by achieving such economies, and by taking advantage of all technological advances and developments, has the corporation remained competitive and created significant cost savings for its telephone customers and their subscribers.

Targets for all

Northern Telecom's cost-reduction programs cover direct manufacturing costs and also the more difficult-to-measure indirect costs or expenses. Total sales for each division are estimated for the year, then cost-improvement targets are set. The targets are based on a percentage of projected cost of sales. The divisions then must find ways to reach these cost-saving objectives.

The 1977 overall target for Northern Telecom Canada, for example, was 8 percent. An estimated 8.9 percent was actually achieved. The figures for 1976 were 7.8 percent targeted, 8.9 percent achieved.

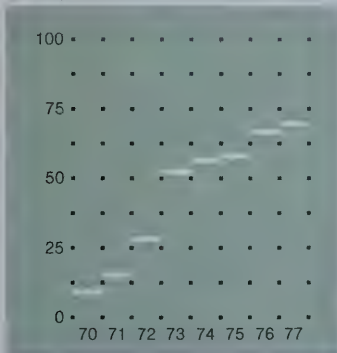
Value analysis seminars are used to sharpen cost-reduction perceptions. These workshop-type sessions involve examining specific procedures to determine where costs might be reduced or, in the case of products, where improvements may be made.

Seminar participants strip everything down to basic functions, then ask: "Is this function necessary?" Participation by people from Northern Telecom plants throughout North America and elsewhere assures maximum cross-fertilization of ideas. In three seminars held in 1976 and 1977, about \$6 million of potential savings were identified; of which \$1.6 million has been realized, and \$3.8 million is scheduled for implementation.

Expense value analysis seminars are also held. A cross-section of administrators, plant management and business system specialists generally take part. Clerical methods improvements and common standards for measuring administrative productivity are among areas examined.

Another example of the corporation's cost-reduction program is the managerial controls program instituted in 1970 to apportion work fairly among members of each staff group. It involves work simpli-

Proprietary products as percentage of manufacturing sales (percent)



Top
Technologists at Northern Telecom's Manufacturing Research Center check the durability of electrical components by performing an "accelerated life test", in which pollutants are blown through a controlled-environment chamber and their effect on the components is analysed.

Bottom
The advent of solid-state technology has made possible the replacement of electro-mechanical equipment with smaller, advanced automated parts, such as the printed circuit board (PCB) pictured here.

fication, elimination of unnecessary routines, setting of time targets and providing staffing guides to managers. Estimated measurable savings from this program have totalled almost \$17 million since inception; including about \$3 million in 1977.

Procurement savings

Northern Telecom buys from some 6,000 suppliers and it purchases more than \$550 million annually. In 1971, the corporation created a separate procurement group primarily to initiate a cost-reduction program. Working with suppliers, a number of successful strategies were developed; notably greater emphasis on volume purchasing. Savings are being achieved by combining the requirements of various divisions and negotiating corporate purchasing contracts against which the divisions can draw and benefit from corporation-wide volume discounts. Large savings are also achieved through a world-wide sourcing program that enables divisions to save through bulk purchasing as well as through alternate sourcing. Savings from these measures were estimated to be \$11 million in 1977. Total saved since 1972 is almost \$50 million.

One measure of the efficiency of a company's controls is how effectively it optimizes its inventories; the higher its rate of inventory turnover without sacrificing production or service, the lower its investment in inventory and the greater the benefit to its cash flow. While Canadian sales (excluding sales tax) rose from \$691.4 million in 1974 to \$825.6 million in 1977, inventories actually declined from \$206.6 million to \$172 million; the result of an aggressive management program aimed at reducing the amount of inventory investment per cash dollar of sales.

Savings from recycling

A portion of Northern Telecom's raw material needs is obtained through recycling of scrap metals and plastics. The corporation has invested \$1 million in processing equipment at Lachine, Quebec, to upgrade recycled materials to usable or salable levels. Scrap reclamation, mainly copper, was valued at \$11 million in 1977, a total that is expected to more than double during the next five years through the

addition of more processing equipment and expansion of sources.

The corporation's worldwide activities and high volume of shipments made transportation costs and efficiency improvement possible through the establishment of a company truck fleet in 1975. Cross-dock terminals were rented in Toronto and Montreal to act as marshalling points for shipments across Canada, into the United States and overseas. Air shipments from Northern Telecom Canada's U.S. suppliers (mainly for semiconductors) are consolidated at Toronto. About 50 percent of the corporation's surface shipments are made by its own fleet. The balance is handled by common carriers. The use of the corporation fleet and measures taken to ensure proper tariff and freight rate selection saved the corporation an estimated \$4 million over the past three years.

Substantial savings were also achieved by strict control of business systems developments in such areas as data processing costs. By making sure that all development in this area is justified on an economic recovery basis, Northern Telecom has been

ticated. A total of 5,839 ideas were received in 1977, of which 474 resulted in awards of \$200 or more. The highest single award was \$30,130. Annual savings to the company since the plan was introduced in 1942 total \$8.8 million.

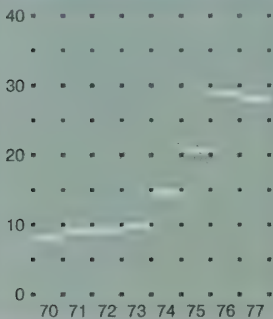
One of the areas of greatest impact on the corporation's continuous striving for improved productivity has been in the performance of its research staff. To stimulate their performance and to provide recognition for their technical innovation, the corporation introduced its invention awards program under which it offers awards of \$3,000 each to members of its scientific, engineering and technical staffs who develop commercially viable and patentable ideas.

Productivity for customers

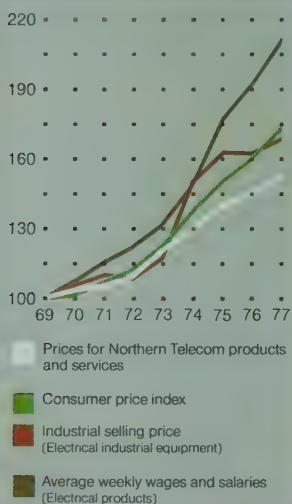
Productivity is a key consideration with Northern Telecom's customers as well. They welcome new systems that reduce material and labor, and perform more functions for the same or lower costs than older equipment. The BNR-designed Traffic Operator Position System (TOPS) is a notable and much-copied example.

TOPS was developed to deal

Annualized savings, manufacturing cost reductions (Canada) (\$ millions)



Price and wage indices



A suggestion that computer output microfilm be used for SP-1 documents instead of computer printouts and paper earned David Eagles of Brampton, Ontario, \$30,130. In addition to monetary rewards to employees, benefits of Northern Telecom's suggestion award program include improved productivity for the company through cost and efficiency improvement.



able to record cost reductions of an estimated \$19.3 million in the last three years.

Grassroots ideas

The drive to improve performance and productivity runs from the top to the bottom in the corporation. Many productivity improvements come from the corporation's employees through a suggestion award program which offers cash incentives for acceptable ideas. Some ideas advanced are relatively simple; other suggestions are quite technical and sophis-

with the problem of rapidly rising volumes of long-distance calls needing operator assistance. TOPS was designed with the operator in mind. It replaced the conventional switchboard with a keyboard terminal and a video screen on which call details are displayed. The operator uses the keyboard to set up calls and feed special data, such as a caller's credit card number, directly into the telephone company's computerized billing system. TOPS creates a better working environment, giving each



operator a pleasant, individual work station. In addition, training is simplified.

In terms of the number of calls per hour that each toll operator can handle, TOPS increases productivity 30-to-35 percent compared with a switchboard equipped office. TOPS lowers costs for telephone companies and provides faster and better service for the telephone user. There are 890 TOPS in operation in North America, from Alaska to Puerto Rico.

A vast number of productivity improvements have been made in switching systems, notably automated diagnosis and main-

tenance, greatly increased service range, system flexibility and reliability and particularly space savings, an extremely critical factor for operating companies faced with skyrocketing real estate costs.

Northern Telecom's DMS family of digital switching machines requires only one-seventh the

floor area of step-by-step equipment of comparable line-handling capacity. In cable and transmission systems, more signals are being concentrated onto individual circuits, cutting expenditures for copper and other hardware. The DMS-1 subscriber carrier system can reduce telephone service installation and maintenance costs by reducing cable requirements as much as 64-to-1. The system also makes it possible to provide urban-quality service to rural communities. Party lines, for example, can be eliminated where it could not be done economically before.

In business communications systems, productivity gains are found in user time-and-cost saving features such as SL-1's single-button access to subscriber services, on-hook dialing and centralized, automated toll-billing capabilities.

Telephone user the real winner

With world demand for telecommunications services doubling every 10 years, plus accelerating inflation of labor and materials costs, continuing productivity improvements are needed for operating companies to maintain quality of service at high levels. As it is, North Americans have the most economical, and most universal, telephone service in the world. This is the result of industrywide planning, estab-

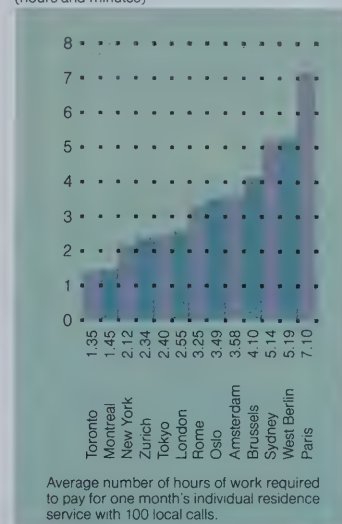
lishment of uniform operating standards on a continent-wide basis and above all, continuing investment in improved equipment.

Consumer prices in Canada rose an average of 7.2 percent per year since 1969; the domestic prices of Northern Telecom products rose an average of only 5.4 percent during the same period.

This has contributed to a relatively low-cost telephone service for Canadian consumers. In Toronto, an average person works one hour and 35 minutes to pay for one month's basic telephone service. In New York he would have to work 37 minutes longer for the same service. In Tokyo, he would have to work an hour longer. In London he would work nearly three hours and in Paris, seven hours to pay for one month's service.

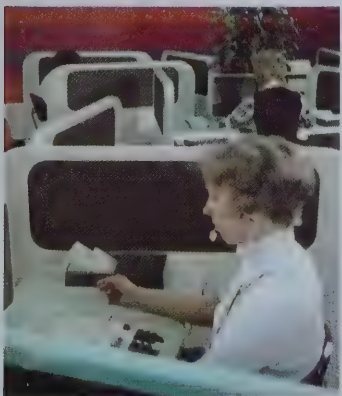
Northern Telecom faces unique challenges as a high-technology company competing in international markets. It has shown that management skills and innovation at all levels in the corporation can create market-leading products, improved productivity and cost conditions. It expects to exceed past performances.

Relative cost of telephone service (hours and minutes)



Top
Precision telecommunications test equipment is vital to the efficient and profitable operation of a telephone network. Northern Telecom, Inc. engineers specialized in the production of this equipment at the Northeast Electronics Division in Concord, New Hampshire, exchange ideas for new designs.

Bottom left
In the comfortable and efficient setting of TOPS (Traffic Operator Position System) an operator monitors information appearing on the video display unit in front of her. TOPS' capacity to handle a wide range of traffic services enables telephone companies of any size to handle their own toll operator services at minimum cost and top efficiency.



tenance, greatly increased service range, system flexibility and reliability and particularly space savings, an extremely critical factor for operating companies faced with skyrocketing real estate costs. Northern Telecom's DMS family of digital switching machines requires only one-seventh the

Financial review

Sales and earnings 1977 versus 1976

Consolidated sales of \$1.269 billion and net earnings of \$85.3 million in 1977 were 14 percent and 11 percent above 1976 levels.

Sales

Total Canadian sales of \$1.014 billion were 5 percent or \$48.4 million higher than in 1976, notwithstanding a \$10.9 million decline in distribution sales. The sales increase included \$15.6 million from consolidation of Bell-Northern Research Ltd. (BNR) for the full year in 1977 compared with five months in 1976; the balance being attributable to price increases and, to a somewhat lesser extent, higher export volume. The volume of sales to domestic customers was relatively flat primarily because of the slow growth of the Canadian economy. The Canadian gross national product is estimated to have grown by only 2.6 percent in real terms in 1977. The growth rate of telephone company capital expenditures was estimated to be only 3 percent compared with 10 percent in 1976. Housing starts which were particularly affected by the weak economic situation, declined by an estimated 12 percent from 1976.

Sales in the United States increased by \$80.5 million or 71 percent. Cook Electric Company, acquired in December 1976, contributed \$38.5 million to the increase. Cook's total 1977 sales showed a marked improvement from its annual sales level before merging with Northern Telecom. The other major contributor to United States sales growth was higher sales of SL-1 business communications systems in the independent telephone operating company market and in sales in the interconnect market to large corporations and institutions.

Sales attributable to manufacturing operations outside North America increased 84 percent to \$60.7 million in 1977. The major source of this growth was the corporation's manufacturing operations in Turkey following settlement of a labor dispute early in 1977 and completion in late 1976 of construction which almost doubled the size of the plant.

Worldwide telecommunications sales were 84 percent of total sales in 1977 compared

with 82 percent in 1976. Switching systems, subscriber equipment products and wire and cable recorded sales gains from 1976 levels. In addition, sales of outside plant products were significantly increased by the acquisition of Cook. Sales of transmission products were reduced by the low demand in Canada for additional message-carrying capacity.

Sales to Bell Canada, its telephone subsidiary and associated companies declined as a percentage of total sales to 48 percent in 1977 from 55 percent in 1976.

Costs

The aggregate of cost of sales and other operating expenses totalling \$1.130 billion increased 15 percent in 1977.

The corporation's gross profits as a percentage of sales increased to 29 percent in 1977 from 28 percent in 1976; productivity improvement programs and price increases being largely offset by cost escalations. The principal reasons for cost escalations were the impact of inflation on the costs of purchased materials, labor and overhead and, to a relatively lesser extent, the decline of the Canadian dollar relative to the United States dollar which had an impact during 1977 on the cost of United States sourced components, such as semiconductors. Gross profits were also depressed by the deferral in Canada of price increases from February 1 to April 1, 1977, under an agreement with the Canadian federal Anti-Inflation Board.

Three major factors combined to increase selling, general and administrative expenses to \$160.6 million in 1977 from \$121.8 million in 1976, or 13 and 11 percent of sales, respectively. In order of relative importance these factors were: (1) inflation of compensation and benefit costs, (2) investments in sales and marketing organizations to support future sales growth, particularly in the U.S., and (3) inclusion of Cook costs of \$7.7 million in 1977.

Research and development spending in 1977 emphasized the corporation's continuing commitment to digital and semiconductor technologies. Total expenditures in 1977 increased to \$103.1 million from \$88.1 million in 1976, a 17 percent rise. These expen-

ditures included the cost of sales of research and development to customers, principally Bell Canada, and costs expended pursuant to specific contracts for the manufacture of telecommunications equipment not yet delivered and therefore inventoried. The net expense of research and development to the corporation was \$68.5 million in 1977 and \$61.5 million in 1976. BNR, the center of the corporation's research and development activities, increased its employees to 2,183 at the end of 1977 from 1,948 at year-end 1976. The sales benefits of much of the corporation's research and development programs should become more evident as the full range of the corporation's digital products is introduced to the market in the next few years.

Earnings from operations

Operating earnings increased by \$8.4 million, or 6 percent, to \$138.4 million, but declined as a percentage of sales to 11 percent in 1977 from 12 percent in 1976.

Investment and other income (net)

A strong cash flow generated higher average holdings of short-term investments with a consequent increase in income from investments of 7 percent. Other income (net) includes the gain of \$3.9 million, net of moving costs, resulting from the sale to Bell Canada of a long-term lease on a building, the majority of which is occupied by Bell Canada. The sale was part of an exchange of properties whereby the corporation simultaneously purchased from Bell Canada a building, the majority of which is occupied by Northern Telecom. Both transactions were made at independent appraisal values.

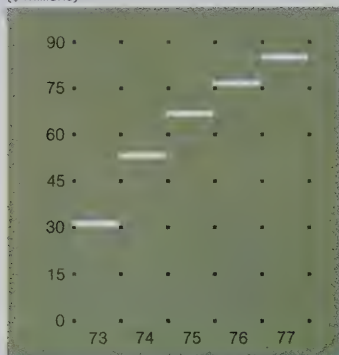
Interest charges

Interest charges declined slightly to \$6.5 million, with a decrease in long-term debt being offset by higher average levels of notes payable and higher interest rates thereon.

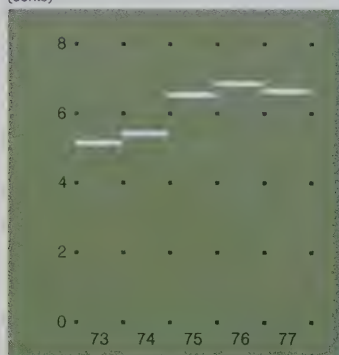
Income taxes

The effective income tax rate, excluding the recovery of prior years' tax losses shown as an extraordinary item of \$3.4 million in 1977 and \$3.2 million

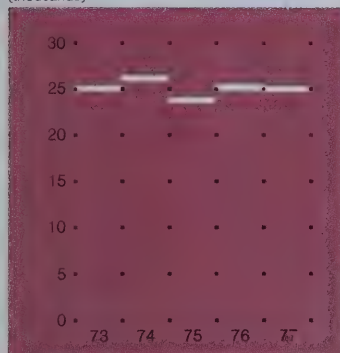
Net earnings (\$ millions)



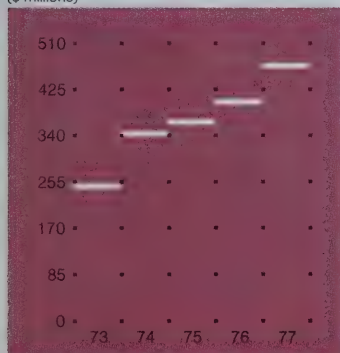
Net earnings per sales dollar (cents)



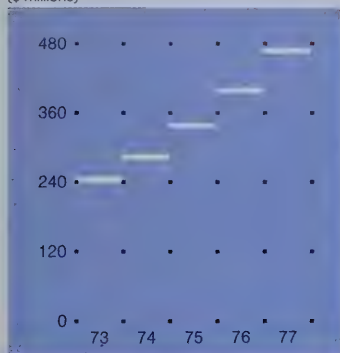
Number of employees
(thousands)



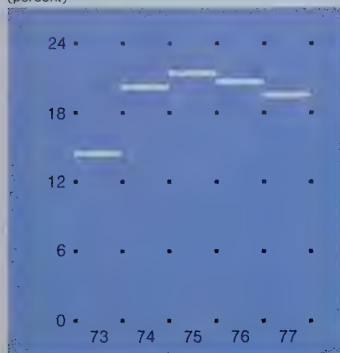
Total compensation
(\$ millions)



Shareholders' equity
(\$ millions)



Return on shareholders' equity
(percent)



in 1976, declined in 1977 to 40.4 percent compared with 42.7 percent in 1976. This was mainly the result of tax credits of 3 percent on inventories for resale and 5 percent on certain research and development expenditures which became effective in 1977.

Net earnings

Consolidated net earnings of \$85.3 million were up \$8.2 million from 1976. The minority interest in net profit of subsidiary companies of \$5.7 million increased significantly from \$2.9 million in 1976 because of improvement in the Turkish subsidiary's operating profits in the local currency. However, after making provision for withholding tax and currency fluctuations, the corporation's share of those profits was \$1.3 million, down from \$2.7 million recorded in 1976.

The net earnings effects of currency fluctuations were minimal as gains on exports and translation of the accounts of foreign subsidiaries were offset by increased costs of imports.

Financial position

Funds provided from operations for 1977 were \$127.4 million, an increase of 22 percent from the 1976 level of \$104.3 million. These funds were used in 1977 to pay dividends of \$17.5 million or 66 cents per share to the shareholders, to invest \$46 million in new plant and equipment and to acquire shares in two companies, Intersil, Inc. and DATA 100 Corporation, for a total investment of \$76.3 million. Working capital increased by \$29.9 million in 1977, after making these payments, thereby maintaining the trend of improved working capital established since 1972.

Investments

The corporation invests funds in three principal areas: research and development, plant and equipment and acquisitions.

During 1977 Northern Telecom, Inc., acquired for \$11.6 million, 24 percent of the issued voting stock of Intersil, Inc. Based in Cupertino, California, Intersil is a developer and manufacturer of large scale integrated circuits and computer components.

As of December 31, 1977

Northern Telecom had purchased for \$18.8 million, 26 percent of the issued common shares of DATA 100 Corporation (DATA 100). Headquartered in Minneapolis, Minnesota, DATA 100 manufactures multi-function computer terminals and computer peripheral equipment. As part of an agreement with DATA 100 the corporation was given an option to purchase up to an additional one million shares from DATA 100 for US\$15 per share. The option is reduced by any purchases of DATA 100 shares, made in the open market by the corporation, and expires on December 31, 1978.

A definitive agreement was signed on January 24, 1978 under which Northern Telecom would acquire all the outstanding shares of Sycor, Inc. The agreement which is subject to approval by Sycor shareholders and certain other conditions, would require issuance of approximately 3,150,000 shares depending on the price of the corporation's stock in a period before the effective date of the acquisition. Sycor, based in Ann Arbor, Michigan, develops, produces and markets systems for distributed data processing.

On January 5, 1978, Northern Telecom, Inc., the corporation's largest U.S. subsidiary, acquired Danray, Inc. Danray, with headquarters in Dallas, Texas, manufactures computer-controlled switching systems complementary to Northern Telecom's product line. This acquisition was made for US\$23 million.

These investments provide access to technologies which are becoming increasingly important in telecommunications and related fields and are consistent with Northern Telecom's intent to lead in the development of a full line of products to create integrated information systems and networks.

Northern Telecom expects that R&D expenditures will continue to increase in order to remain competitive in products and prices. The corporation believes that a higher level of investment in research and development is essential to maintain its position among the leading international telecommunications manufacturers.

Plant investments were directed towards the creation of new, and the improvement of existing, facilities and to the

upgrading of equipment to parallel changing technology. The corporation's capital spending in 1977 amounted to \$46 million, compared with \$41.1 million in 1976.

Dividends and stock prices

The corporation increased its dividend in the fourth quarter to \$0.18 per share, resulting in a total of \$0.66 per share paid in 1977, an increase of five cents per share from 1976.

Northern Telecom's shares are traded on the Montreal, New York, Toronto and Vancouver stock exchanges. On February 17, 1978, the closing price of the common shares was US\$23.125 on the New York Stock Exchange.

The following table shows the high and low price of the common shares on the Toronto Stock Exchange for the past two years:

1977		
Quarter	High	Low
Fourth	30	26
Third	35¼	26¾
Second	34¼	30¾
First	33¾	28¾
1976		
Fourth	34¾	28½
Third	40¼	32
Second	40¾	34¼
First	38¼	26

Sales and earnings 1976 versus 1975

Consolidated sales and net earnings in 1976 were \$1.112 billion and \$77.1 million respectively, showing improvements of 9 percent and 14 percent compared with the 1975 results.

Sales

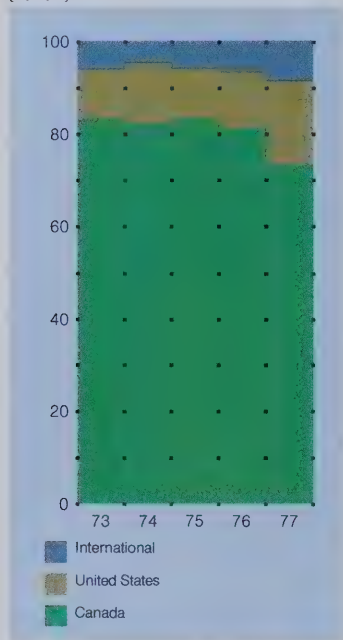
The increase in sales was principally attributable to higher prices and to higher volumes of switching, cable and subscriber equipment products, somewhat offset by lower volume of transmission products.

Sales to Bell Canada, its telephone subsidiary and associated companies increased to 55 percent of total sales in 1976 compared with 50 percent in 1975.

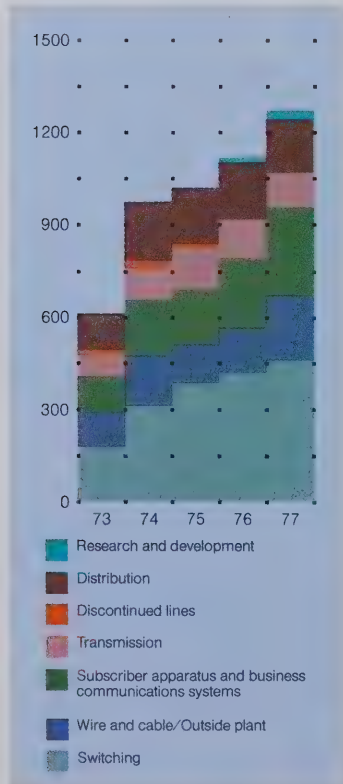
Costs

Gross profits as a percentage of sales improved to 28.2 percent in 1976 from 27.5 percent in 1975. This improvement was achieved through major efforts

Telecommunications sales (at point of destination) by geographic area (Percent)



Sales by principal products and services (\$ millions)



to effect productivity gains and cost reduction programs, as well as certain price increases.

Selling, general and administrative expenses increased to 11 percent of sales in 1976 compared with 10 percent in 1975. The increase was a result of expansion of selling and marketing activities, particularly in the United States and international markets and higher costs for compensation and benefits.

Net research and development expenses were \$61.5 million in 1976 compared with \$49.1 in 1975, an increase of 25 percent occasioned by Northern Telecom's development program for digital products and the decision to maintain its level of research and development programs following repeal in 1976 of the Canadian federal government incentives for these activities, under which the corporation had received \$4.4 million in 1975.

Earnings from operations and other items

Earnings from operations increased 2.9 percent in 1976 compared with 1975. Interest charges decreased 17.8 percent from \$8.3 million to \$6.8 million, reflecting the repayment of some long-term debt, sinking fund debentures, and lower interest rates. Income from investments was up \$5.1 million to \$8.9 million, due to increased cash availability, in part because of improved control over inventories and receivables.

The effective tax rate, excluding the recovery of prior year's tax losses, increased in 1976 to 42.7 percent, relative to the 1975 level of 41.1 percent as a result of a changed mix of consolidated earnings.

Extraordinary income in 1976 of \$3.2 million resulted principally from the use of prior years' tax losses of a subsidiary while in 1975 there

was an extraordinary charge of \$2.7 million related to the provision for losses derived from the discontinuance of that subsidiary's semiconductor operations.

Business segments and principal product lines

The following table sets forth revenue and profit data for each of Northern Telecom's business segments, and revenue data for the principal product lines in the telecommunications equipment manufacturing segment for each of the five years ended December 31, 1977.

Business segments and principal product lines

(as approved by the board of directors)

	(thousands of dollars)				
	1977	1976	1975	1974	1973
Sales to customers (1)					
Telecommunications					
equipment manufacturing					
Central office switching.	\$ 455,803	\$ 421,331	\$ 385,716	\$313,705	\$177,122
Subscriber apparatus and business communications systems.	278,879	222,950	178,658	181,378	117,401
Wire, cable and outside plant.	215,127	145,984	126,588	157,182	111,655
Transmission.	114,468	124,512	136,192	103,208	69,556
Discontinued lines.	—	—	4,850	23,712	16,109
	1,064,277	914,777	832,004	779,185	491,843
Electrical & electronic products distribution.	173,710	184,625	186,378	191,526	120,978
Other (principally research and development) (2).	30,658	12,607	—	—	—
Total.	\$1,268,645	\$1,112,009	\$1,018,382	\$970,711	\$612,821
Operating earnings (1)					
Telecommunications					
equipment manufacturing. . .					
	\$ 201,629	\$ 177,882	\$ 156,135	\$128,728	\$ 78,920
Electrical & electronic products distribution.	8,043	8,666	15,115	17,407	9,427
Total.	\$ 209,672	\$ 186,548	\$ 171,250	\$146,135	\$ 88,347

Notes:

(1) Sales to customers, and operating earnings for 1976 and prior years have been restated to conform with the presentation adopted in 1977.

(2) Other includes sales of BNR, a non-profit making research and development organization, from August 3, 1976.

**Consolidated
statement of
earnings**

(year ended December 31)

	1977	1976
	(thousands of dollars)	(thousands of dollars)
Sales (note 20)	\$1,268,645	\$1,112,009
Cost of sales	901,183	798,722
Gross profit	367,462	313,287
Selling, research and development, and general and administrative expenses (note 2)	229,079	183,300
Earnings from operations	138,383	129,987
Investment and other income (net) (note 3)	11,242	8,878
	149,625	138,865
Interest charges		
Long-term debt	3,889	4,446
Other	2,673	2,373
	6,562	6,819
Earnings before underlisted items	143,063	132,046
Provision for income taxes (note 4)	55,549	55,231
	87,514	76,815
Minority interest in net profit of subsidiary companies	5,681	2,879
Net earnings before extraordinary item	81,833	73,936
Extraordinary item (note 5)	3,422	3,163
Net earnings for the year	\$ 85,255	\$ 77,099
Net earnings per share		
— before extraordinary item	\$3.09	\$2.79
— after extraordinary item	\$3.22	\$2.91

**Consolidated
statement of
retained earnings**

(year ended December 31)

	1977	1976
	(thousands of dollars)	(thousands of dollars)
Balance at beginning of year	\$ 241,834	\$ 180,882
Net earnings for the year	85,255	77,099
	327,089	257,981
Deduct dividends paid	17,470	16,147
Balance at end of year	\$ 309,619	\$ 241,834

**Consolidated
balance sheet**

(as at December 31)

	1977	1976
	(thousands of dollars)	(thousands of dollars)
Assets		
Current		
Cash and short-term investments at cost (approximates market value)	\$103,760	\$ 96,469
Accounts receivable		
Affiliated companies	43,111	45,532
Other	181,062	124,440
Inventories (note 6)	225,467	227,470
Prepaid expense	6,789	4,482
Deferred income taxes	14,987	15,257
	<u>575,176</u>	<u>513,650</u>
Investments		
Associated companies – at equity (note 18)	31,113	—
Other	2,304	2,204
	<u>33,417</u>	<u>2,204</u>
Plant and equipment (note 7)	192,224	176,675
Goodwill (note 1)	10,080	13,854
	<u>\$810,897</u>	<u>\$706,383</u>

On behalf of the Board of Directors

James C. Thackray, Director

Charles Perrault, Director

	1977	1976
	(thousands of dollars)	(thousands of dollars)
Liabilities		
Current		
Notes payable (note 8)	\$ 26,741	\$ 29,204
Accounts payable and accrued liabilities		
Affiliated companies	2,423	2,061
Other	181,260	139,574
Taxes payable	19,588	27,568
Long-term debt instalments due within one year (note 9)	569	508
	230,581	198,915
Long-term debt (note 9)	52,376	58,278
Deferred income taxes	48,621	41,200
Minority interest in subsidiary companies	10,718	7,174
	342,296	305,567
Shareholders' equity		
Capital stock (note 10)	158,982	158,982
Retained earnings	309,619	241,834
	468,601	400,816
	\$810,897	\$706,383

**Consolidated statement
of changes in
financial position**

(year ended December 31)

	1977	1976
	(thousands of dollars)	(thousands of dollars)
Source of funds		
Operations		
Net earnings before extraordinary item	\$ 81,833	\$ 73,936
Items not requiring funds		
Depreciation and amortization	31,589	24,579
Deferred income taxes	7,421	486
Minority interest in net profit of subsidiary companies	5,681	2,879
Other	892	2,414
Total from operations	127,416	104,294
Extraordinary item (note 5)	3,422	3,163
Proceeds from sale of plant and equipment	1,038	9,318
Proceeds from long-term debt	742	-
Elimination of investment in Bell Northern Research Ltd. at time of acquisition	-	14,454
	132,618	131,229
Application of funds		
Expenditures for plant and equipment	46,016	41,119
Net non-current assets acquired	-	18,198
Reduction of long-term debt	6,644	20,378
Dividends	17,470	16,147
Investment in affiliated company	-	2,345
Investment in associated companies (note 18)	30,379	-
Acquisition of goodwill	-	9,356
Other	2,249	242
	102,758	107,785
Increase in working capital	29,860	23,444
Working capital at beginning of year	314,735	291,291
Working capital at end of year	\$344,595	\$314,735
The increase in working capital is accounted for by		
Increase (decrease) in current assets		
Cash and short-term investments	\$ 7,291	\$ 43,187
Accounts receivable	54,201	26,868
Inventories	(2,003)	(1,558)
Prepaid expense	2,307	(3,402)
Deferred income taxes	(270)	3,057
(Increase) decrease in current liabilities		
Notes payable	2,463	(14,401)
Accounts payable and accrued liabilities	(42,048)	(23,306)
Taxes payable	7,980	(12,782)
Long-term debt due within one year	(61)	5,781
Increase in working capital as above	\$ 29,860	\$ 23,444

1. Accounting policies

The accompanying financial statements have been prepared in accordance with Canadian generally accepted accounting principles. With respect to Northern Telecom Limited and its subsidiary companies, the only important difference between Canadian and United States generally accepted accounting principles is in regard to the accounting for translation of foreign currency transactions and financial statements of foreign subsidiary companies as described in note 17.

Principles of consolidation

The consolidated financial statements include the accounts of Northern Telecom Limited (the corporation) and all subsidiary companies. When stock ownership and control of subsidiary companies is acquired, the income of these companies is included in the consolidated financial statements only to the extent of the income earned since the date of acquisition of control.

Translation of foreign currencies (see note 17)

The accounts of the foreign subsidiary companies have been translated into Canadian dollars at exchange rates prevailing at the balance sheet dates for working capital items, at exchange rates prevailing at the respective transaction dates for non-current assets and liabilities (and related depreciation and amortization) and at average exchange rates prevailing during the years for income and expenses.

Depreciation

Depreciation is calculated on the straight-line method using rates based on the expected useful lives of the respective assets as follows:

Buildings 2½-5 percent; machinery 6½-16½ percent; tools 15-33½ percent; and furniture and fixtures 10 percent.

Research and development

Research and development expenditures are charged to earnings in the years in which they are incurred, except for expenditures incurred on behalf of customers, which are charged to earnings in the same period as the related revenue is recognized.

Income taxes

The corporation and its subsidiary companies follow the practice of providing for income taxes based on taxable income included in the financial statements regardless of when such income is subject to payment of taxes under the tax laws. Reductions in income taxes relating to losses carried forward in subsidiary companies are not taken up in the accounts until the date of their realization.

Inventories

Inventories are valued at the lower of cost (calculated generally on a first-in first-out basis) and net realizable value. The cost of finished goods and work-in-process inventories is comprised of material, labor and manufacturing overhead.

Goodwill

Goodwill represents the unamortized excess of the acquisition costs over the net assets of subsidiary companies and is amortized over periods not exceeding forty years. Amortization charged to earnings for the years 1977 and 1976 was \$731,000 and \$642,000, respectively.

2. Research and development

Research and development expenditures amounted to \$103,133,000 and \$88,148,000 in 1977 and 1976 respectively. These expenditures included cost of sales of research and development to customers, principally Bell Canada, and costs expended pursuant to specific contracts for the manufacture of telecommunications equipment not yet delivered and therefore inventoried. In 1976 the expenditures of \$88,148,000 included \$13,185,000 made by Bell-Northern Research Ltd. before it became a subsidiary of the corporation on August 3, 1976. The net expense of research and development to the corporation was \$68,500,000 in 1977 and \$61,486,000 in 1976.

3. Investment and other income (net)

Included in investment and other income (net) in 1977 are the following:

(a) Equity in the net earnings of associated companies \$734,000.

(b) The corporation sold to Bell Canada a long-term lease on a building, the majority of which is occupied by Bell Canada. The sale was part of an exchange of properties whereby the corporation simultaneously purchased from Bell Canada a building, the majority of which is occupied by the corporation. Both transactions were made at independent appraisal values. The gain on sale of the lease was \$4,821,000 with related moving costs of \$930,000.

4. Provision for income taxes

A reconciliation of the statutory income tax rates in Canada to the effective income tax rates for the year ended December 31, is as follows:

	1977		1976	
	\$	%	\$	%
Canadian income taxes at statutory rate including provincial income taxes.	\$65,943,000	48.0%	\$62,000,000	48.0%
Reductions of Canadian taxes applicable to manufacturing profits.	(6,775,000)	(5.0)	(7,176,000)	(5.6)
Reduction of Canadian taxes applicable to inventory and research and development.	(3,295,000)	(2.3)	—	—
Other.	(324,000)	(0.3)	407,000	0.3
	<u>\$55,549,000</u>	<u>40.4%</u>	<u>\$55,231,000</u>	<u>42.7%</u>

Losses of a subsidiary company carried forward for income tax purposes totalling approximately \$28,000,000 have not yet been recognized in the accounts. These losses may be offset against taxable income of future years up to 1982.

5. Extraordinary item

The extraordinary item of \$3,422,000 and \$3,163,000 for the years 1977 and 1976 respectively represents a reduction of income taxes arising from the use of prior years' tax losses of subsidiary companies.

6. Inventories

At December 31, inventories consisted of the following:

	1977	1976
Raw materials.	\$ 59,212,000	\$ 55,654,000
Work-in-process.	86,420,000	84,810,000
Finished goods.	79,835,000	87,006,000
	<u>\$225,467,000</u>	<u>\$227,470,000</u>

7. Plant and equipment

At December 31, plant and equipment consisted of the following:

	1977	1976
Cost		
Land.	\$ 12,798,000	\$ 10,782,000
Buildings.	85,551,000	81,736,000
Machinery and equipment.	297,301,000	273,137,000
Property under capital leases.	2,848,000	2,848,000
	<u>398,498,000</u>	<u>368,503,000</u>
Less: Accumulated depreciation and amortization		
Buildings.	26,319,000	23,649,000
Machinery and equipment.	178,147,000	166,675,000
Property under capital leases.	1,808,000	1,504,000
	<u>206,274,000</u>	<u>191,828,000</u>
	<u>\$192,224,000</u>	<u>\$176,675,000</u>

8. Notes payable

The following information relates to aggregate commercial paper borrowing, largely with maturities ranging up to 90 days:

	1977	1976
Amount outstanding at December 31	\$26,741,000	\$29,204,000
Maximum amount outstanding at any month-end during the year ended December 31	\$39,401,000	\$38,282,000
Average amount outstanding during the year ended December 31	\$36,758,000	\$33,360,000
Weighted average annual interest rate during the year ended December 31	6.74%	6.56%
Weighted average interest rate at December 31	7.06%	5.94%

9. Long-term debt

	1977	1976
Sinking fund debentures		
5¼% 1962 Series due December 15, 1982	\$ 7,234,000	\$ 8,259,000
6½% Series C due April 15, 1986	4,843,000	8,971,000
9¼% Series D due April 30, 1990	29,177,000	30,097,000
	41,254,000	47,327,000
Notes payable by Cook Electric Company—7%	2,354,000	2,569,000
Debentures of Bell-Northern Research Ltd. and B-N Software Research Inc. payable to Bell Canada	8,167,000	7,425,000
Obligations under capital leases	1,170,000	1,465,000
	52,945,000	58,786,000
Less: Amount included in current liabilities	569,000	508,000
	\$52,376,000	\$58,278,000

At December 31, 1977, the amount of long-term debt payable, including net sinking fund requirements, in the years 1978 through 1982, was \$569,000, \$785,000, \$2,728,000, \$2,569,000 and \$6,413,000, respectively.

10. Capital stock

On April 13, 1977, an annual and special general meeting of the shareholders of Northern Telecom Limited was held in Montreal, Quebec. The shareholders authorized the application for continuance of the corporation under the Canada Business Corporations Act. A Certificate of Continuance was subsequently issued by the Department of Consumer and Corporate Affairs of Canada with an effective date of May 1, 1977.

As a result of the continuance of the corporation under the Canada Business Corporations Act, the corporation now has an unlimited number of authorized shares and there is no limit to the consideration to be received by it upon issue of such shares.

Outstanding shares at December 31, 1977 and 1976 and consideration received were:

26,469,494 common shares	\$158,982,000
------------------------------------	---------------

11. Remuneration of directors and officers

During the year 1977, there were 19 directors of the corporation whose aggregate remuneration as such was \$155,000. During 1977 three officers of the corporation and three directors and officers of subsidiaries served as directors of the corporation for varying periods but received no remuneration as directors of the corporation.

The corporation had 21 officers during the year 1977. The aggregate remuneration paid to such officers and to three officers and directors of subsidiaries was \$2,825,000.

12. Plans for employees' pensions

The corporation and certain of its subsidiary companies have pension plans which provide pensions based on length of service and rates of pay. The most significant of these are the corporation's plans for negotiated, and managerial and non-negotiated Canadian employees. The actuarial valuation of these plans as of December 31, 1976 indicated that all vested benefits were fully funded. The funding programs meet the requirements of the federal and provincial laws.

The cost of the plans charged to earnings for the years ended December 31, 1977 and 1976 was \$33,345,000 and \$30,921,000, respectively.

13. Leased property and commitments

In 1977 the corporation adopted the policy of capitalizing certain leases. The effect of this change in policy has been to decrease 1977 net earnings by \$5,000. The comparative balance sheet for 1976 has been restated to give retroactive effect to the change. However as the amount is immaterial, prior years' earnings have not been restated.

The classification of future minimum lease payments under capital and operating leases as at December 31, 1977 is as follows:

	Capital	Operating
Year ending December 31		
1978.	\$ 558,000	\$ 7,815,000
1979.	516,000	7,317,000
1980.	353,000	4,837,000
1981.	177,000	3,765,000
1982.	167,000	3,570,000
Thereafter.	404,000	30,680,000
Total commitments.	<u>\$2,175,000</u>	<u>\$57,984,000</u>

Included in capital lease commitments are amounts representing estimated executory costs of \$355,000 and interest of \$650,000. Future sublease rentals related to operating leases are \$2,411,000.

Rental expense on operating leases amounted to \$14,256,000 in 1977 and \$11,237,000 in 1976.

14. Trust agreement restrictions

Under the terms of the trust agreement relating to the debentures of the corporation, there are certain restrictions with respect to the payment of dividends (other than stock dividends) and the purchase, redemption or reduction of any of its shares. As at December 31, 1977 \$302,864,000 of shareholders' equity was free from these restrictions.

15. Canadian anti-inflation legislation

Northern Telecom Limited and its Canadian subsidiary companies are subject to anti-inflation legislation which became effective in Canada on October 14, 1975. This legislation limits increases in profit margins, prices, dividends and compensation.

Under an agreement with the Anti-Inflation Board, Northern Telecom Limited deferred to April 1, 1977 certain domestic price increases that would otherwise have been effected on February 1, 1977.

On October 20, 1977, the Canadian federal government announced that it will begin to phase out its anti-inflation program in April 1978. With respect to the corporation, controls over profit margins, prices and dividends will end by December 1978.

Based on available information, management of the corporation is of the opinion that, in all material respects, Northern Telecom Limited and its Canadian subsidiary companies are in compliance with the legislation, subject to the approval by the Anti-Inflation Board of certain compensation plans.

16. Quarterly financial data

Summarized consolidated quarterly financial data for 1977 and 1976 is as follows:

	(dollars in millions except per share figures)							
	4th quarter		3rd quarter		2nd quarter		1st quarter	
	1977	1976	1977	1976	1977	1976	1977	1976
Sales.....	\$321.4	\$279.5	\$297.3	\$250.8	\$342.4	\$305.1	\$307.5	\$276.6
Gross profit.....	\$ 94.8	\$ 76.1	\$ 89.6	\$ 72.3	\$ 99.9	\$ 86.5	\$ 83.2	\$ 78.4
Net earnings before extraordinary item....	\$ 19.8	\$ 16.7	\$ 18.1	\$ 15.4	\$ 24.2	\$ 22.5	\$ 19.7	\$ 19.3
Net earnings.....	\$ 21.4	\$ 17.9	\$ 18.8	\$ 16.4	\$ 24.8	\$ 23.0	\$ 20.3	\$ 19.8
Net earnings per share — before extraordinary item.....	\$0.75	\$0.63	\$0.68	\$0.58	\$0.91	\$0.85	\$0.75	\$0.73
— after extraordinary item.....	\$0.81	\$0.67	\$0.71	\$0.62	\$0.93	\$0.87	\$0.77	\$0.75

17. Translation of foreign currencies (see note 1)

The corporation follows Canadian generally accepted accounting practice in translating foreign currencies. If these financial statements had been translated at exchange rates as required in the United States by the U.S. Financial Accounting Standards Board, net earnings as reported would have been reduced by \$271,000 (\$0.01 per share) in 1977 and by \$924,000 (\$0.03 per share) in 1976. The maximum effect on quarterly earnings per share in either year was \$0.07 per share.

18. Investments in associated companies, acquisitions and mergers

During 1977 the corporation and its subsidiary companies acquired interests in two companies and reached agreement in principle to acquire control of two others. Details of these purchases follow:

(a) Intersil, Inc.

An interest of approximately 24 percent in the outstanding capital stock of Intersil, Inc. was acquired by a subsidiary of the corporation for a cash consideration of \$11,616,000.

(b) DATA 100 Corporation

An interest of approximately 26 percent in the issued common stock of DATA 100 Corporation was acquired by the corporation for a cash consideration of \$18,763,000. The market value of the investment at December 31, 1977 was \$13,660,000.

The investments in Intersil, Inc. and DATA 100 Corporation are accounted for by the equity method and the excess of the cost over the equity in the underlying net tangible assets amounting to \$9,700,000 is being amortized over periods not exceeding forty years.

(c) Sycor, Inc.

An agreement in principle was reached on December 5, 1977 with Sycor, Inc. to acquire all outstanding Sycor shares from the Sycor shareholders. On January 24, 1978 a definitive agreement which is subject to approval of Sycor shareholders and to certain other conditions, was reached with Sycor confirming the agreement in principle. The agreement will require issuance of approximately 3,150,000 shares of the corporation depending on the price of the corporation's stock in a period before the effective date of the acquisition. The acquisition will be accounted for on the purchase basis.

Total revenues and net earnings of Sycor in 1977 were approximately \$83,985,000 and \$3,483,000, respectively.

(d) Danray, Inc.

On December 6, 1977, an agreement was reached in principle for a subsidiary of the corporation to merge with Danray, Inc. The merger was finalized on January 5, 1978. The transaction is being accounted for as a purchase at a cash consideration of \$25,162,000.

Sales and net earnings of Danray in 1977 were approximately \$15,850,000 and \$2,302,000, respectively.

On August 3, 1976, the corporation purchased 70,000 unissued common shares of Bell-Northern Research Ltd. for \$70,000 cash, thereby increasing the corporation's ownership from 49 to 70 percent.

In December 1976 a subsidiary of the corporation merged with Cook Electric Company at a cost of \$30,276,000 in cash, and another subsidiary acquired Telecommunication Systems of America, Inc. at a cost of \$721,000 in cash.

The acquisitions made in 1976 were accounted for as purchases and had no impact on the net earnings for 1976. Had these purchases been made on January 1, 1976, sales for 1976 would have been approximately \$1,175,331,000 and net earnings, and net earnings per share, both before extraordinary item, would have been approximately \$76,144,000 and \$2.88, respectively.

19. Replacement cost data — unaudited

In accordance with the requirements of the United States Securities and Exchange Commission, the corporation has developed replacement cost information for inventories and productive capacity together with the related estimated effect of such costs on the cost of sales and depreciation expense for the years ended December 31, 1977 and 1976.

Replacement costs include the effects of inflation and are generally higher than historical values reported in the corporation's financial statements. These data are included in the corporation's annual report on Form 10-K filed with the Securities and Exchange Commission, a copy of which is available on request from the corporation's vice-president, corporate relations.

20. Information on business segments and geographic areas

Business segments (as approved by the board of directors)

In 1977 the corporation operated in two major businesses: (1) telecommunications equipment manufacturing which involves the production and sale of central office switching equipment, subscriber apparatus and business communications systems, transmission equipment, wire and cable and outside plant products and (2) electrical and electronic products distribution which involves the sale of a wide range of electrical and electronic products. In addition the corporation has a non-profit making research and development organization which is included in "other". The following table sets forth information concerning the business segments for the year ended December 31, 1977.

	Telecom- munications equipment manufac- turing	Electrical and elec- tronic pro- ducts distri- bution	Other	Adjust- ments and eliminations	Consolidated
(thousands of dollars)					
Sales to customers*	\$1,064,277	\$ 173,710	\$ 30,658	\$ —	\$1,268,645
Intersegment sales	27,052	4,635	54,646	(86,333)	—
Total sales	<u>\$1,091,329</u>	<u>\$ 178,345</u>	<u>\$ 85,304</u>	<u>\$ (86,333)</u>	<u>\$1,268,645</u>
Operating earnings	<u>\$ 201,629</u>	<u>\$ 8,043</u>	<u>\$ —</u>	<u>\$ (33)</u>	<u>\$ 209,639</u>
Investment and other income (net), less interest charges**					4,680
General corporate expenses					(71,256)
Earnings before income taxes, minority interest and extraordinary item					<u>\$ 143,063</u>
Identifiable assets	<u>\$ 563,456</u>	<u>\$ 51,404</u>	<u>\$ 52,327</u>	<u>\$ (16,625)</u>	<u>\$ 650,562</u>
Investment in associated companies					31,113
Corporate assets					<u>129,222</u>
Total assets as at December 31, 1977					<u>\$ 810,897</u>
Depreciation—identifiable assets	<u>\$ 24,332</u>	<u>\$ 403</u>	<u>\$ 5,212</u>	<u>\$ —</u>	<u>\$ 29,947</u>
Depreciation—corporate assets					<u>1,642</u>
Total depreciation					<u>\$ 31,589</u>
Capital expenditures— identifiable assets	<u>\$ 37,272</u>	<u>\$ 564</u>	<u>\$ 6,894</u>	<u>\$ —</u>	<u>\$ 44,730</u>
Capital expenditures— corporate assets					<u>1,286</u>
Total capital expenditures					<u>\$ 46,016</u>

Total sales by business segment include both sales to customers, as reported in the corporation's consolidated statement of earnings, and intersegment sales, which are made at prices based on total cost of the product to the supplying segment.

Of the total sales to customers, including research and development, Bell Canada, its telephone subsidiary and associated companies accounted for \$612,608,000 in 1977 and \$608,850,000 in 1976.

Operating earnings represent total sales less operating expenses. In computing operating earnings, none of the following items has been added or deducted: investment and other income (net), interest charges, general corporate expenses, income taxes, minority interest and extraordinary item.

Identifiable assets by business segment are those assets that are used in the corporation's operations in each business. Corporate assets are principally cash and investments.

Geographic areas

The following table sets forth information about operations in different geographic areas for the year ended December 31, 1977:

	Canada	U.S.A.	Other	Adjustments and eliminations	Consolidated
	(thousands of dollars)				
Sales to customers*	\$1,014,368	\$ 193,565	\$ 60,712	\$ —	\$1,268,645
Transfers between geographic areas	44,414	6,473	6,482	(57,369)	—
Total sales	<u>\$1,058,782</u>	<u>\$ 200,038</u>	<u>\$ 67,194</u>	<u>\$ (57,369)</u>	<u>\$1,268,645</u>
Operating earnings before research and development expenses	<u>\$ 227,179</u>	<u>\$ 29,108</u>	<u>\$ 20,233</u>	<u>\$ 1,619</u>	\$ 278,139
Research and development expenses					(68,500)
Operating earnings					209,639
Investment and other income (net), less interest charges**					4,680
General corporate expenses					(71,256)
Earnings before income taxes, minority interest and extraordinary item					<u>\$ 143,063</u>
Identifiable assets	<u>\$ 462,030</u>	<u>\$ 144,886</u>	<u>\$ 70,440</u>	<u>\$ (26,794)</u>	\$ 650,562
Investment in associated companies					31,113
Corporate assets					129,222
Total assets as at December 31, 1977					<u>\$ 810,897</u>

Transfers between geographic areas are made at prices based on total cost of the product to the supplying segment.

Operating earnings before research and development expenses represent total sales less operating expenses, excluding research and development costs which cannot be allocated on a geographic basis. In computing operating earnings, none of the following items has been added or deducted: investment and other income (net), interest charges, general corporate expenses, income taxes, minority interest and extraordinary item.

Identifiable assets are those assets of the corporation that are identified with the operations in each geographic area. Corporate assets are principally cash and investments.

*Sales to customers include sales to Bell Canada, its telephone subsidiary and associated companies.

**Includes equity in net earnings of associated companies.

21. Reclassification

Certain comparative figures for the year ended December 31, 1976 have been reclassified to conform with the presentation adopted in the current year.

Auditors' report

The Shareholders
Northern Telecom Limited

We have examined the consolidated balance sheets of Northern Telecom Limited as at December 31, 1977 and 1976 and the consolidated statements of earnings, retained earnings, and changes in financial position for the years then ended. Our examinations were made in accordance with generally accepted auditing standards, and accordingly included such tests and other procedures as we considered necessary in the circumstances.

In our opinion, these consolidated financial statements present fairly the financial position of the corporation as at December 31, 1977 and 1976 and the results of its operations and the changes in its financial position for the years then ended in accordance with Canadian generally accepted accounting principles applied (after giving retroactive effect to the change, which we approve, in the method of accounting for lease agreements as referred to in note 13) on a consistent basis.

Touche Ross & Co.

Chartered Accountants

Montreal, Quebec
February 3, 1978



Condensed consolidated statement of earnings

(dollar amounts in millions except per share figures)

	1977	1976	1975	1974	1973
Sales.....	\$1,268.6	\$1,112.0	\$1,018.4	\$ 970.7	\$ 612.8
Cost of sales.....	(901.2)	(798.7)	(738.2)	(725.3)	(452.1)
Operating expenses.....	(229.0)	(183.3)	(153.8)	(139.2)	(99.3)
Earnings from operations.....	138.4	130.0	126.4	106.2	61.4
Investment and other income (net)	11.3	8.8	3.7	2.9	3.8
Interest charges.....	(6.6)	(6.8)	(8.3)	(7.7)	(6.6)
Provision for income taxes.....	(55.5)	(55.2)	(49.7)	(50.6)	(30.6)
Minority interest in net (profit) loss of subsidiary companies before extraordinary items.....	(5.7)	(2.9)	(1.9)	3.0	4.0
Net earnings before extraordinary items.....	81.9	73.9	70.2	53.8	32.0
Extraordinary items*	3.4	3.2	(2.7)	—	—
Net earnings.....	\$ 85.3	\$ 77.1	\$ 67.5	\$ 53.8	\$ 32.0
Net earnings per share**					
— before extraordinary items.....	\$ 3.09	\$ 2.79	\$ 2.65	\$ 2.05	\$ 1.35
— after extraordinary items.....	\$ 3.22	\$ 2.91	\$ 2.55	\$ 2.05	\$ 1.35

An analysis of continuing and discontinued operations resulting from the termination of the semiconductor business of Microsystems International Limited including an extraordinary item in 1975 is as follows:

Sales:

Continuing operations.....	\$1,268.6	\$1,112.0	\$1,013.5	\$ 947.0	\$ 596.9
Discontinued operations.....	—	—	4.9	23.7	15.9
	\$1,268.6	\$1,112.0	\$1,018.4	\$ 970.7	\$ 612.8

Net earnings:

Continuing operations.....	\$ 85.3	\$ 77.1	\$ 71.9	\$ 62.2	\$ 38.1
Discontinued operations.....	—	—	(4.4)	(8.4)	(6.1)
	\$ 85.3	\$ 77.1	\$ 67.5	\$ 53.8	\$ 32.0

Net earnings per share:**

Continuing operations.....	\$ 3.22	\$ 2.91	\$ 2.72	\$ 2.38	\$ 1.61
Discontinued operations.....	—	—	(0.17)	(0.33)	(0.26)
	\$ 3.22	\$ 2.91	\$ 2.55	\$ 2.05	\$ 1.35

*Net of income taxes and minority interest

**Based on average number of shares outstanding (thousands)	26,469	26,469	26,433	26,164	23,671
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**Consolidated
ten-year review**

1977 1976 1975 1974 1973 1972 1971 1970 1969 1968

(millions of dollars)

**Earnings
and related data**

Total sales. \$1,268.6 \$1,112.0 \$1,018.4 \$ 970.7 \$ 612.8 \$ 534.3 \$ 576.3 \$ 563.6 \$ 482.5 \$ 426.3

Sales of company
manufactured
products. 1,093.8 950.6 865.2 812.8 517.7 451.5 475.9 463.9 390.7 345.3

Depreciation on
plant and equipment 31.6 24.6 23.8 25.8 16.6 13.0 11.7 12.4 10.5 9.9

Research and
development
expenses. 68.5 61.5 49.1 44.1 32.7 28.0 29.7 31.0 25.9 21.7

Interest charges. . . . 6.6 6.8 8.3 7.7 6.6 5.6 5.7 5.1 3.6 2.7

Provision for income
taxes. 52.1 52.1 47.6 50.7 30.6 21.0 14.5 5.3 9.8 5.6

Net earnings. 85.3 77.1 67.5 53.8 32.0 20.1 12.6 4.1 11.0 9.4

Earnings per sales
dollar (cents). 6.7 6.9 6.6 5.5 5.2 3.8 2.2 .7 2.3 2.2

Earnings per share
(dollars). 3.22 2.91 2.55 2.05 1.35 0.85 0.54 0.17 0.52 0.49

Dividends per share
(dollars). 0.66 0.61 0.60 0.525 0.50 0.50 0.50 0.38 0.50 0.50

**Financial position
at December 31**

Working capital. 344.6 314.7 291.3 284.2 210.9 175.8 177.5 188.9 150.0 122.3

Plant & equipment
(at cost). 398.5 368.5 290.1 278.2 261.5 237.5 230.0 233.2 214.9 194.5

Accumulated
depreciation. 206.3 191.8 164.8 158.2 142.5 128.4 124.4 125.3 115.5 108.3

Capital expenditures. 46.0 41.1 32.5 33.7 26.8 19.5 21.9 20.9 24.2 12.4

Long-term debt. 52.4 58.3 67.8 104.5 69.6 73.5 77.1 79.0 41.9 43.0

Shareholders' equity. 468.6 400.8 339.9 285.2 245.0 192.1 183.8 183.0 180.4 145.0

Employees at
December 31. 24,962 25,277 23,751 26,147 25,073 20,787 23,230 24,986 26,032 23,682

Compensation

Payroll. 395.3 347.2 325.0 301.2 214.1 192.2 199.8 206.2 187.0 159.2

Benefits. 75.0 58.0 45.0 41.2 35.1 30.0 28.5 25.4 18.1 16.2

Total. \$ 470.3 \$ 405.2 \$ 370.0 \$ 342.4 \$ 249.2 \$ 222.2 \$ 228.3 \$ 231.6 \$ 205.1 \$ 175.4

Principal products

Subscriber apparatus

Rotary dial, push-button and key telephones
Decorator telephones
Coin telephones
Handsfree units
Repertory dialers
Modular hardware

Business communications systems

Packet switching systems
Key telephone systems
Electronic and digital PABX systems

Central office switching systems

Step-by-step switching systems
Crossbar switching systems
Electronic switching systems
Digital switching systems

Transmission systems

Analog and digital carrier systems
Analog and digital multiplex systems
Analog and digital microwave radio systems
Voice frequency equipment and systems

Cable

Power cables
Telephone wires
Composite coaxial cables
Switchboard cables
Paper-pulp and paper-ribbon insulated telephone cables
Polyolefin insulated telephone cables
Universal frame wires
Fiber optic systems and components

Outside plant products

Cable terminals
Loading coils

Protectors and connectors
Apparatus cases and splicing enclosures
Connecting blocks

Power equipment

Power plants
Ringing and tone equipment

Test equipment products

Transmission test equipment
Signaling and supervision test equipment
Service observation, office analysis and switching test equipment
PCM carrier test equipment

Manufacturing facilities

Canada

Switching

Brampton, Ont.
Digital, electronic and electro-mechanical switching systems, parts and components

Calgary, Alta.
Electronic switching equipment, cable forming

Charlottetown, P.E.I.
Central office fuses

LaSalle, Que.
Step-by-step switching systems, power equipment, connectors, multiple cables and relays

Montreal, Que.
Sheet-metal and piece parts, machines and tools

St. John's, Nfld.
Networks and sensors

Winnipeg, Man.
Cable forming, dry-reed relays, networks

Subscriber Equipment

Amherst, N.S.
Residential and business telephones and components

Belleville, Ont.
Electronic and digital PABXs, printed circuit boards, printed circuit packs, components and key telephone systems

London, Ont.
Residential and business telephone sets, parts and components

Regina, Sask.
Telephone sets, buzzers and modular hardware

Saint John, N.B.
Cables for PABXs and connector cables

Cable

Amherst, N.S.
Telephone cable

Calgary, Alta.
Telephone cable

Kingston, Ont.
Telephone and switchboard cable and enamel wire

Lachine, Que.
Communication cable, power cable and building wire

Regina, Sask.
Telephone cable

Transmission

Aylmer, Que.
Digital subscriber carrier equipment, digital channel banks and repeaters, hybrid circuits and components

St. Laurent, Que.
Multiplex, voice frequency and radio equipment, printed circuit packs and device testing

Winnipeg, Man.
Cable forming and digital transmission components

Repair and Overhaul

Calgary, Alta.
Repair and overhaul of telephone sets

Montreal North, Que.
Repair and overhaul of telephone sets, test sets, teletypewriters, electronic equipment and data terminals

North York, Ont.
Repair and overhaul of telephone sets, test sets, teletypewriters, electronic equipment and data terminals

Saint John, N.B.
Repair and overhaul of telephone sets and test sets

Outside Plant

St. Laurent, Que.
Backboards, apparatus cases, connectors, loading devices, protectors, terminals and closures

Winnipeg, Man.
Protectors

United States

Adelanto, Cal.
Repair and overhaul of telephone sets

Creedmoor, N.C.
Electronic and digital switching systems, digital PABXs

Concord, N.H.
Voice frequency and test equipment

Kevil, Ky.
Repair and overhaul of telephone sets

Leesburg, Fla.
Repair and overhaul of telephone sets

Medina, N.Y.
Repair and overhaul of telephone sets

Morton Grove, Ill.
Outside plant equipment, toll data collection systems, loop treatment and voice frequency equipment and tape transports

Mountain View, Cal.
Electronic and digital PABXs

Nashville, Tenn.
Telephone sets and hybrid circuits

Richardson, Tex.
Private switching networks, PABX

Sanford, N.C.
Repair and overhaul of telephone sets

Tampa, Fla.
Repair and overhaul of telephone sets

Texarkana, Tex.
Repair and overhaul of telephone sets

West Palm Beach, Fla.
Printed circuit boards, printed circuit packs

Republic of Ireland

Galway
Telephone sets, PABX components, and voice frequency equipment

Brazil

Rio de Janeiro
Outside plant equipment, protectors

Turkey

Istanbul
Electro-mechanical switching systems, switchboards and telephone apparatus

Malaysia

Penang
Heat coils, cable forms, capacitors, telephone set components and integrated circuit assembly

